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**Slack – Performance Relationship Before, During and  
After a Financial Crisis: Empirical Evidence from  
European Manufacturing Firms**

By

**MURAT KARACAY**

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## Abstract

All organizations need to adapt to their environment to be able to survive and prosper. An adaptation can be a transformation, change or modification in the organizational behavior that assists a firm to survive and prosper in the event of unexpected environmental conditions. It has also been argued that organizational slack resources are the means of achieving adaptations as different kinds of slack resources may be associated with different types of organizational adaptations in response to different environmental conditions. Specifically, this study examines how firms adjust their slack resources in response to a financial crisis. The performance-induced effects can be further moderated by risk-taking and environmental uncertainty. Theoretically, the study uses several slack-related theories and extends the slack-performance relationship to the situation of environmental uncertainty and especially compares and contrasts slack performance relationships before, during and after financial crisis.

In doing so to identify different adaption profiles for different environmental resulting in different outcomes. The implications of this is to better management of slack resources for adapting different environmental conditions, facilitating to take risky initiatives, absorbing unexpected external shocks. The study further develops and operationalizes an adaptive slack model by incorporating with behavioural theory, agency theory, resource-based view, resource constraint theory, prospect theory and threat rigidity theory. Taking the financial crisis of 2007-08 as a base model that influences investment and a firm's resource position and performance decline, this study identified the deployment of two main adaptation processes: alignment and adaptability. In applying the theory into practice this study aims to contribute to the understanding of how European manufacturing companies can perform these adaptation processes, and extend knowledge about the role of organizational slack in the context of financial crisis where it facilitates those adaptation activities.

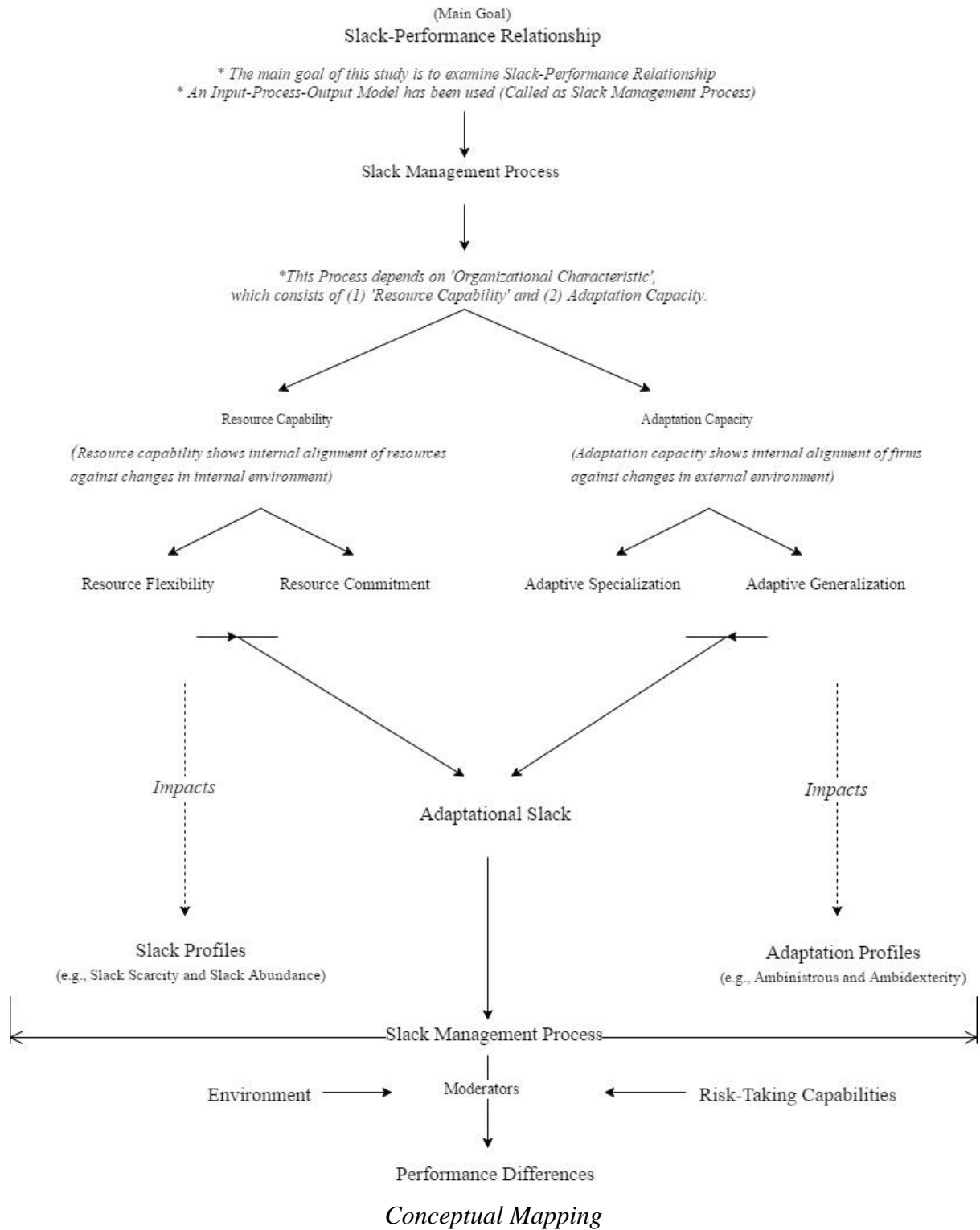
In this study, slack-performance relationship has been examined in terms of *level of slack*, *forms of slack*, *risk-of slack* and adaptation of slack before, during and after financial crisis. To that end, this study investigates empirically, publicly-held 671 western European manufacturing firms, by comparatively examining their organisational slack management and performance characteristics before, during and after the recent financial crisis period 2007-8.

This research employs longitudinal panel data. The data was drawn from Thomson one banker database for the period of 2004-2013. Based on the panel data, several multivariate tests and multiple regression models were applied. Our findings indicate that adaptation is a dichotomous construct as different forms of adaptations require different forms of organizational slack in order to adapt different environmental settings that are associated with different performance implications. The findings also show that the effect of the financial crisis is clearly visible on firm performance. The results evidence that impact of financial crisis on general firm performance is negative and significant by around (-16%). The study also found that slack-performance has a positive but a curvilinear relationship in general. Specifically, firms prefer to use more *strategic slack* rather than *operating slack resources* during the financial crisis. However, firms began to focus more on operating slack resources than strategic slack resources after the financial crisis or re-gaining the alignment.

The findings also revealed that constructs of alignment and adaptability are distinct and continuous constructs. However, four distinct adaptation profiles are found as ambidextrous, ambisinistrous, adaptability oriented and alignment oriented firms which are clearly differentiated along the combination of high- low levels of both alignment and adaptability dimensions which in turn are defined in terms of operating slack ( for alignment dimension ) and strategic slack ( for adaptability dimension ).

Research findings show that slack management is a process. However, the one of the anticipated contribution is to examine how firms may become ambidextrous over-time depend on forms, types, and level of their slack resources. The key finding is that when firms be able to effectively manoeuvre at the edge of adaptability- alignment trade-off, they do so by driving adaptability and alignment to achieve year- to year firm performance. Simultaneous ambidexterity appeared to as more significant influencing factor than sequential ambidexterity. The finding also provide evidence that ambidextrous firms are resilience that is a valuable firm capability to sustain long-run competitive advantage over-time. Simultaneous ambidexterity is an essential organisational necessity in high-speed environment, which organizations considering existing environment and current opportunities.

Keywords: *Organizational slack, slack management, resource flexibility, resource commitment, alignment, adaptability, flexibility, ambidexterity, financial crisis, environmental munificence, environmental dynamism, strategic risk, operating risk, adaptation process, performance*



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# Contents

Abstract.....	II
Acknowledgements.....	V
Contents .....	VI
List of Table(s).....	XI
List of Figure(s) .....	XII
List of Abbreviation(s).....	XIII
Chapter 1 .....	1
Introduction.....	1
1.1. Overview.....	1
1.2. Research Motivation and Background.....	7
1.3. Research Gap .....	13
1.4. Research Objectives.....	22
1.5. Research Question.....	30
1.6. Thesis Structure.....	31
Summary .....	35
Chapter 2.....	36
Introduction.....	36
2.1. Literature Review.....	37
2.1.1. Organizational Slack .....	37
2.1.1.1. Previous Literature and organizational slack .....	43
2.1.1.1.1. The Origin of Slack and Earlier Studies .....	43
2.1.1.1.2. Most Cited and Recent Studies .....	46
2.1.1.2. Forms of Slack .....	48
2.1.1.3. Functions of Slack.....	62
2.1.1.4. Antecedents of Slack.....	69
2.1.1.5. The Fields of Potential and Functional Use .....	75
2.1.1.5.1. Potential Use .....	76
2.1.1.5.2. Functional Use .....	80
2.1.2. Slack-Performance Relationship.....	81
2.1.2.1. Theories.....	83
2.1.2.1.1. Slack and Resource Based View (RBV).....	83
2.1.2.1.2. Slack and Resource Constraint Theory (RCT).....	85
2.1.2.1.3. Slack and Behaviour Theory of Firms (BTF) .....	87
2.1.2.1.4. Slack and Agency Theory (AT) .....	88
2.1.2.1.5. Slack and Prospect Theory (PT) .....	89

2.1.2.1.6.	Slack and Threat Rigidity Theory (TRT).....	91
2.1.2.1.7.	Traditional Views.....	93
2.1.2.1.7.1.	Positive or Negative Perspectives .....	93
2.1.2.1.7.2.	Linear or Curvilinear Perspectives .....	96
2.1.2.1.8.	Non-Traditional Views .....	98
2.1.2.1.8.1.	Level of Slack – (Less vs. Much) - Perspective .....	100
2.1.2.1.8.2.	Perception of Slack- (Good vs. Bad) - Perspective.....	102
2.1.2.1.8.3.	Risk of Slack - (Risk-Averse vs. Risk-Seeking) - Perspective .....	105
2.1.3.	Slack Management.....	109
2.1.3.1.	Organizational Characteristics (Internal) .....	113
2.1.3.1.1.	Resource Capabilities.....	118
2.1.3.1.1.1.	Slack and Resource Commitment .....	118
2.1.3.1.1.2.	Slack and Resource Flexibility.....	120
2.1.3.1.2.	Adaptational Capacity .....	122
2.1.3.1.2.1.	The Process of Adaptation .....	122
2.1.3.1.2.2.	The Organisational Adaptability .....	124
2.1.3.1.2.3.	Flexibility, Alignment and Adaptability .....	126
2.1.3.1.3.	Resource Capability and Adaptation Capacity.....	132
2.1.3.1.4.	Resource Capability, Adaptation Capacity and Performance .....	139
2.1.3.2.	Risk-Taking Behaviours (Internal) .....	140
2.1.3.2.1.	Slack and Risk-Taking Capabilities .....	142
2.1.3.2.2.	Operating Risk .....	144
2.1.3.2.3.	Strategic Risk .....	145
2.1.3.3.	Environment and Financial Crisis (External).....	146
2.1.3.3.1.	Environmental Conditions (industry factors).....	146
2.1.3.3.1.1.	Environmental Munificence.....	146
2.1.3.3.1.2.	Environmental Dynamism .....	147
2.1.3.3.2.	Financial Crisis .....	149
2.1.3.3.3.	Stages of Financial Crisis and Organisational Adaptation.....	150
2.1.4.	Resource Ambidexterity .....	153
2.1.4.1.	How is Ambidexterity Achieved?.....	157
2.1.4.1.1.	Simultaneous Ambidexterity.....	158
2.1.4.1.2.	Sequential Ambidexterity .....	159
	Summary .....	163
	Chapter 3.....	164
	Introduction.....	164



3.	Conceptual Framework and Hypotheses Developments.....	165
3.1.	Adaptational Slack .....	167
3.1.1.	Operating Slack.....	169
3.1.2.	Strategic Slack.....	170
3.2.	Adaptational Slack Allocation .....	173
3.2.1.	Why is Adaptational Slack a Need?.....	174
3.2.2.	Allocation Mechanism of Adaptational Slack .....	179
3.2.3.	Adaptational Profiles.....	187
3.2.3.1.	Ambinistrrious Profile .....	187
3.2.3.2.	Alignment – Oriented Profile.....	188
3.2.3.3.	Adaptability-Oriented Profile.....	189
3.2.3.4.	Ambidextrous Profile .....	190
3.3.	Hypotheses Development .....	191
3.3.1.	Slack-Performance Relationship.....	191
3.3.2.	Adaptation Process.....	196
3.3.3.	Adaptation Profiles .....	198
3.3.3.1.	Impact of Financial Crisis .....	202
3.3.3.2.	Operating Slack and Financial Crisis.....	<b>Error! Bookmark not defined.</b>
3.3.3.3.	Strategic Slack and Financial Crisis.....	<b>Error! Bookmark not defined.</b>
3.3.3.4.	Curvilinear Relationship .....	205
3.3.4.	Environmental Munificence and Dynamism .....	206
3.3.5.	High Performer and Low Performer Firms Based on Risk-Taking Behaviours .....	208
3.3.6.	Risk-Taking Capabilities.....	210
3.3.6.1.	Adaptation and Moderating Role of Strategic Risk .....	212
3.3.6.2.	Adaptation and Moderating Role of Operating Risk .....	212
3.3.6.3.	Adaptation and Interactions between Risk-Taking and Financial Crisis .....	213
3.3.7.	Resource Ambidexterity .....	214
3.3.7.1.	Simultaneous Ambidexterity.....	215
3.3.7.2.	Sequential Ambidexterity .....	216
	Summary .....	217
	Chapter 4.....	218
	Introduction.....	218
4.	Research Methodology .....	218
4.1.	Measures .....	244
4.1.1.	Interpreting Performance Variables .....	252
4.1.2.	Interpreting the Slack Variables.....	253

4.1.3.	Interpreting Adaptation Slack .....	260
4.1.3.1.	Strategic Slack.....	260
4.1.3.2.	Operating Slack.....	260
4.1.4.	Interpreting Adaptation Process .....	261
4.1.5.	Interpreting Environmental Variables.....	261
4.1.6.	Interpreting the Risk Factors.....	263
4.1.7.	Interpreting Ambidexterity Variables .....	264
4.1.8.	Interpreting Control Variables .....	267
4.2.	Data Analysis .....	218
4.2.1.	Sample selection, industry classification and unbalanced panel data .....	221
4.2.2.	Data Corrections .....	224
4.3.	Econometric Specifications.....	225
4.3.1.	Multivariate Analyses .....	225
4.3.1.1.	Factor Analysis, K-mean Clustering and Discriminant Function Analysis .....	225
4.3.1.2.	Multiple Regression .....	229
4.4.	Econometric Models .....	232
	Summary .....	270
Chapter 5.....		271
	Introduction.....	271
5.	Results.....	272
5.1.	Determination of Financial Crisis .....	272
5.2.	Financial Crisis, Slack –Performance Linear Relationship in General .....	275
5.2.1.	Descriptive Statistics and Correlations for Slack Variables.....	275
5.2.2.	Slack and Performance Relationship in Different Periods.....	277
5.2.3.	Adaptation Processes - Multivariate Tests .....	292
5.2.3.1.	Factor Analysis (EFA) .....	292
5.2.3.2.	Cluster Analysis .....	298
5.2.3.3.	The Discriminant Function Analysis (DFA).....	305
5.3.	Financial Crisis, Environmental Conditions, Slack and Performance Curvilinear Relationship .....	307
5.4.	Financial Distress and Higher and Lower Performance Firms .....	320
5.5.	Risk Taking Behaviours.....	330
5.5.1.	Correlation and Factor Results for Risk-Taking .....	330
5.5.2.	The moderating effect of Risk-Taking Behaviour on organizational adaptation .....	341
5.5.2.1.	Graphical summaries of result .....	346
5.5.3.	Financial Crisis and Risk-Taking Capabilities.....	351

5.6. Ambidexterity .....	354
Summary .....	360
Chapter 6.....	361
Introduction.....	361
6. Discussion.....	361
6.1. Discussion.....	361
6.1.1. Slack versus Performance .....	370
6.1.2. Adaptation Process vs Performance.....	381
6.1.3. Financial Crisis, Environment and Adaptational Slack .....	387
6.1.4. Financial Distress and Higher and Lower Performance Firms .....	390
6.1.5. Risk Taking Capabilities vs Performance.....	392
6.1.6. Ambidexterity vs Performance .....	395
6.2. Managerial Implications .....	<b>Error! Bookmark not defined.</b>
6.3. Conclusion and Limitations .....	416
Summary .....	419
References.....	420
APPENDIX.....	505

## List of Table(s)

Table 1-1- Past empirical studies relative to slack-performance relationship .....	21
Table 2-1- Most cited studies about slack-performance relationship .....	40
Table 2-2 - Some Early Definitions of Slack .....	45
Table 2-3- The most cited articles last 15 years.....	47
Table 2-4- The Slack Management and Functions of Slack .....	70
Table 2-5 -Main Differences and Similarities between Theories .....	108
Table 2-6 - Four Levels of Organizational Characteristics.....	134
Table 2-7 - Adaptation profiles and their corresponding advantages .....	135
Table 2-8 - Some recent studies related to simultaneous and sequential ambidexterity .....	162
Table 4-1- Summary Statistics for Slack Variables .....	224
Table 4-2 - Most Recent Slack Measures .....	246
Table 5-1 – ANOVA for determination of financial crisis .....	272
Table 5-2 - Sample means, standard deviations, and Pearson's correlations for slack variables .....	275
Table 5-3 - Mean comparison of slack for sub-periods .....	276
Table 5-4 - T-test for performance variable(s).....	277
Table 5-5 - FGLS model for slack and performance relationship in different time-periods.....	278
Table 5-6 - Pre-crisis slack impact on post-crisis performance .....	284
Table 5-7 - Descriptive Statistics for Manufacturing Industries .....	289
Table 5-8 -T-test for higher performing industries and lower performing industries .....	290
Table 5-9 - Factor analysis for slack resources .....	293
Table 5-10 - ANOVA test for EFA groups.....	295
Table 5-11 - T-test of slack variables for sub-periods .....	299
Table 5-12 - Mean comprison of cluster groups in different time periods .....	300
Table 5-13 - T-test of performance for sub-periods.....	303
Table 5-14 - ANOVA results among adaptation profiles .....	305
Table 5-15 - Discriminant analyses on adaptation strategies .....	306
Table 5-16 - FGLS regression analysis of slack and financial crisis .....	309
Table 5-17 - Descriptive statistics of the high and low performer firms .....	320
Table 5-18 - T-test for different time-periods.....	322
Table 5-19 - FGLS regression for high - low performing firms across the periods.....	324
Table 5-20 – Firm Performance and Z-Score Relationship .....	328
Table 5-21 – Pearson’s correlations among risk variables.....	331
Table 5-22 - Factor analyses for risk in different time-periods .....	331
Table 5-23 - Post-crisis performance vs. Risk-taking behaviours .....	334
Table 5-24 - Analysis for interaction relationship between slack and risk-taking behaviours .....	337
Table 5-25 - Pearson correlation for risk-taking capabilities .....	343
Table 5-26 - The effect of risk-taking behaviors on adaptation – performance relationship .....	343
Table 5-27 - Financial crisis and risk-taking behaviors .....	352
Table 5-28 - Descriptive statistics and Pearson’s correlation .....	354
Table 5-29 - Resource ambidexterity and firm performance .....	356

## List of Figure(s)

Figure 1-1- Thesis Structure .....	32
Figure 2-1 - Organizational Slack and Firm Performance Total Citations .....	46
Figure 2-2 - Forms of Slack .....	53
Figure 2-3 - Forms of Slack Map.....	62
Figure 2-4 - Functions of Slack.....	64
Figure 2-5 – Predicted single and combined effects of slack related theories .....	95
Figure 2-6 – Linear (Positive and Negative) Relationship.....	97
Figure 2-7 - Curvilinear Relationships.....	97
Figure 2-8 - Classification of theories based on slack-performance relationship .....	99
Figure 2-9 –Less is more.....	101
Figure 2-10 – Perception of slack .....	103
Figure 2-11 - Losses and Gains .....	106
Figure 2-12- Alignment, adaptability and ambidexterity.....	126
Figure 2-13 – Flexibility, alignment and adaptability.....	129
Figure 2-14 - Adaptation capacity and resource capability (stable or unstable fit) relationship.....	136
Figure 2-15 - Relationship between resource capability and adaptation capacity .....	137
Figure 2-16 - Relationship between resource capability and adaptation capacity .....	138
Figure 2-17 - Level of Performance and stage of financial crisis .....	152
Figure 2-18 - Computation of Ambidexterity Constructs .....	155
Figure 3-1 - Conceptual Framework .....	166
Figure 3-2 - Adaptational Slack Framework.....	172
Figure 3-3 - Conceptual diagram for the study .....	174
Figure 3-4 - Corresponding Dual Slack Categorizations in Past Studies.....	175
Figure 3-5 - Adaptation Processes in Different Environmental States .....	176
Figure 3-6 - Relationship between slack and resource commitments .....	178
Figure 3-7 - Slack allocation framework and adaptational slack matrix.....	180
Figure 3-8 - Resource Position of Firms .....	181
Figure 3-9 - Input-process-output model .....	185
Figure 3-10 - Diagram for pre-crisis resources impacts on post-crisis firm performance. ....	195
Figure 4-1 – Data analysis Process .....	220
Figure 4-2 –Simultaneous Ambidexterity.....	266
Figure 4-3 – Sequential Ambidexterity.....	266
Figure 5-1-Performance changes over time in context of country.....	273
Figure 5-2- Sales growth changes overtime across manufacturer industries .....	274
Figure 5-3 -Performance differences in between Manufacturing Industries.....	290
Figure 5-4 -K-density and histogram matching for alignment and adaptability .....	297
Figure 5-5 – Performances of Adaptation profiles.....	304
Figure 5-6 - Adaptation Strategies for whole period and Sub-periods .....	304
Figure 5-7 – Mediating effects of environmental conditions on slack-performance relationship .....	311
Figure 5-8 - Nonlinear adaptational slack forms - firm performance relationship .....	312
Figure 5-9 – Operating slack and performance relationship between crisis and stable time-period... 314	
Figure 5-10 - Strategic slack and performance relationship between crisis and stable time-period... 315	
Figure 5-11 - 3D Plot and counterplot for dynamism vs. munificence vs.slack vs performance .....	318
Figure 5-12 - Performance changes for High and Low performer firms .....	323
Figure 5-13 - Interactions between adaptation slack, risk-taking behaviours and performance .....	339
Figure 5-14- 3D graph for risk-slack-performance relationship .....	340
Figure 5-15 - Performance and adaptation behavior relationship under the different level of risk ....	346
Figure 5-16 - Moderating effect of adaptation behavior on risk-taking and performance relation.....	347

Figure 5-17 - Interaction between risk taking behaviors and adaptation-alignment oriented firm performance .....	350
Figure 6-1 – Time Frequency .....	418

## List of Abbreviation(s)

RBV	Resource Based View
RCT	Resource Constraint Theory
BTF	Behaviour Theory of Firms
AT	Agency Theory
TRT	Threat Rigidity Theory
PT	Prospect Theory
SM	Strategic Management
OT	Organizational Theory
ROA	Return on Assets
MTBV	Market to Book Value
SG&A	Selling, General and Administrative Expenses
PPI	Producer Price Index
EFA	Exploratory Factor Analysis
DFA	Discriminant Function Analysis
FGLS	Feasible Generalize Least Square

# Chapter 1

## Introduction

The introductory chapter proposes to briefly describe resource-motivation and background, research-gaps, research-objectives and outline the structure of the rest of the thesis, including synopses of the earlier empirical studies.

### 1.1.Overview

Companies in western European countries have confronted increasing turbulence, resulting from resource constraints, or capabilities misfit (Karim et al., 2016, Miles et al., 1978, Kistruck et al., 2016, Chakrabarti, 2015). Such a turbulent environment may require adaptation, speed and resource variety, which are important elements, for firms (Bhattacharya et al., 2005, Kistruck et al., 2016, Kiss and Barr, 2014, Evans, 1991).

An unpredictable environment may prompt firms to move more quickly than their competitors in the event that they have sufficient resources and resource variety (Nayyar and Bantel, 1994, Volberda, 1996, Sanchez, 1995, Weigelt and Shittu, 2016, Bahrami and Evans, 2010). Hence, firms incrementally concentrate on attaining their competitive position in the market, based on their level and forms of excess resources (Hughes and Ferrier, 2016, Voss et al., 2008).

Consistent with this view, it has been commonly accepted by many scholars, that a greater level of slack in a course of action is regarded as strategic weapon that provides a relatively better competitive position in market (Fiegenbaum and Karnani, 1991, Combs et al., 2011, Bahrami and Evans, 2010).

Resource flexibility is an essential factor of strategic adaptation because of the dynamic environmental condition (Ben et al., 2016, Sirmon et al., 2007, Sanchez, 1997, Rosenbusch et al., 2013). The existing literature on organizational slack provides insights into the impact of form and level of slack on outcomes of firm performance, such as failure, growth, profitability and survival, (Lungeanu et al., 2015, Sapienza et al., 2006, Tan and Peng, 2003, Delmar et al., 2013). In general, need for resources varies significantly from one company to another, and from one research to another (Sonenshein, 2014, Raastad, 2014, Morrison, 2011).

In this study, the existing literature was extended by examining how organizational slack relates to the firm's performance. Slack is defined here as the "*cushion of operating and strategic slack resources that enable and manage organizational adaptation to environmental jolts*"<sup>1</sup>.

In general, the effect of slack on performance can be regarded from several theoretical perspectives<sup>2</sup> as an important research field; fields, such as management, economics and finance<sup>3</sup>. The concept of slack has been examined in the way that the degree of deployment and accumulation of firm resources may affect firms' short-term and long-term objectives, competitive advantage and thus organizational performance. (Marlin and Geiger, 2015b).

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<sup>1</sup> Related reference is (Rahrovani and Pinsonneault, 2012).

<sup>2</sup> Prior studies in strategic management and organizational theory (OT) have mostly argued a positive association between slack and performance (Hannan and Freeman, 1977, Bourgeois, 1981, Cyert and March, 1963, Chen et al., 2015, Gong and Shi, 2007, Jalilvand and Kim, 2013, Kuusela et al., 2016, Latham and Braun, 2008, Orlando et al., 2016, Shahzad et al., 2016, Vanacker et al., 2016). However, economic theorists have suggested opposite ((Jensen, 1986; Dutta et al., 2016). Nevertheless, besides slack management, risk-taking behaviours and environment as moderators of the exact nature of slack-performance relationships have still to be examined. Furthermore, the characteristic of slack that a firm possesses before a financial crisis, and its implications on performance during and after such a crisis has not been clearly differentiated, in general.

<sup>3</sup> Some relevant references are (Barreto, 2012, Kahneman and Tversky, 1979, Shimizu, 2007, Zona, 2012, Chrisman and Patel, 2012, Jensen, 1986, Singh and Davidson, 2003, Aragon and Sharma, 2003, Barney and Clark, 2007, Modi and Mishra, 2011, Muratova, 2015).



In line with this purpose, the literature suggests that firms utilize slack by investing in resource flexibility, which, in turn, facilitates adaptability<sup>4</sup> so as to absorb the direct, and indirect effects of environmental change (Meyer et al., 1990, Latham and Braun, 2008, Lengnick and Beck, 2005, Stan et al., 2014, Venkataraman, 1998).

Similarly, despite the fact that organizational theory scholars have currently adopted both positive and negative perspectives of role of slack<sup>5</sup>, these scholars have not examined slack management directly or indirectly from the lens of adaptation before, during and after a financial crisis (Dutta et al., 2016, Bourgeois, 1981, Bromiley, 1991).

This study also aims to explain firms' adaptation capacity through using concepts of alignment and adaptability. These two concepts can be seen as forms of strategic paradoxes (Tushman et al., 2010, Huang et al., 2006). These two tensions can also be considered as “a central concern of studies of adaptive processes” (James G March, 1991:71).

“Adaptability refers to novel innovations to achieve long-term sustainability, while alignment refers to operational efficiencies in existing routines for short-term performance” (Smith, 2014:1593). Adaptability implies various factors, such as risk taking, flexibility, innovation, and exploration (March, 1991).

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<sup>4</sup> By incorporating *environmental jolt* into the conceptualization of *slack management, alignment and adaptability* forms of organizational adaptation was clearly distinguished as an *organizational capability* to balance slack management as *resource-commitment and resource-flexibility*. Both forms of adaptation process using time-pace patterns of *financial crisis* was operationalized in different time-periods, which will be explained further sections in detail.

<sup>5</sup> Although the argument of “*slack is good*” has been discussed by many empirical studies related to slack and performance relationship, the arguments from the perspective of “*less slack is better or much slack is better*”, “*slack is a source of flexibility or source of risk*” or “*slack is a risk-seeking strategy or risk-averse strategy*” have not been considered sufficiently in the context of financial crisis, (Daniel et al., 2004, Wang et al., 2016b, Marlin and Geiger, 2015b, Habel and Klarmann, 2015, Lee, 2015).

Alignment indicates efficiency and stability that strengthens adaptability (Smith, 2014, Weigelt and Sarkar, 2012), whereas, adaptability stimulates change and renewal, eliminating risk as much as possible, increasing implementation for alignment strategy (Farjoun, 2010, Reeves and Deimler, 2011). Both concepts have been investigated by management studies related to how firms exploit and explore their resources simultaneously (Raisch et al., 2009).

To explain the notion of ‘*adaptational slack*’<sup>6</sup>, this study is based on the notions of “adaptive generalization” and “adaptive specialization” to describe the distinctive influence of different slack forms on performance in different time-periods as well as under different environmental conditions<sup>7</sup> (Chakravarthy, 1982, Greenley and Oktemgil, 1998).

Slack management<sup>8</sup> is a process that provides organizations with an elucidation of the influences of a financial crisis that impact the level of investment, resource position and performance decline (Singal and Jain, 2016, Dolmans et al., 2014). Past studies show that slack management begins when a firm has sufficient resources available under the control of its operational and managerial activities (Luo et al., 2012, Wang et al., 2016a, Lee et al., 2009, Greenley and Oktemgil, 1998).

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<sup>6</sup> However, ‘*adaptational slack*’ can be conceptualized and operationalized based on the amalgam of resource capability (Kulkarni and Ramamoorthy, 2005, Ruiz, 2006, Sanchez, 1995), adaptation capacity (Thongpapanl et al., 2012, Chakravarthy, 1982, Chakravarthy, 1981, Greenley and Oktemgil, 1998), risk-taking capabilities (Singh, 1986, Bromiley, 1991, March and Shapira, 1987, Tsai and Luan, 2016, Tversky and Kahneman, 1991) and environment (Bradley et al., 2011a, Bradley et al., 2011b, Cheng and Kesner, 1997, Kraatz and Zajac, 2001, Meyer, 1982, Meyer et al., 1990, Wan and Yiu, 2009) in different time-periods. By viewing thus, this thesis aims to develop a new perspective for typology of slack in collaboration with organizational adaptation in different environmental conditions.

<sup>7</sup> In collaboration with environmental conditions, this study examines the slack-performance relationship before, during and after a financial crisis. (Pang et al., 2011, Azadegan et al., 2013b, Bradley et al., 2011b, Cheng and Kesner, 1997, Henriques and Sadorsky, 1996, Wan and Yiu, 2009, Wang et al., 2016a).

<sup>8</sup> Slack management signifies choice, growth, efficiency, generation, implementation, selection, and execution in literature (March, 1991). As March (1991) elucidated, maintaining a suitable balance between these two processes is a key element in firm success, survival and prosperity (Andriopoulos and Lewis, 2009, Birkinshaw and Gupta, 2013, Junni et al., 2013). A firm’s ranking depends on how effectively a firm is managed (Vorhies and Morgan, 2003). Slack management indicates how firms manage short-term and long-term business objective by depending on adaptability and alignment (He and Wong, 2004, Tushman et al., 2010).

The slack management process, through alignment and adaptability, is not only intended to help a firm in its daily operations, it also triggers a process whereby slack-accumulated resources, make these resource available for future investment<sup>9</sup>. Technically, the adaptation process<sup>10</sup>, which is a reflection of slack management, releases a notable amount of flexibility for organizations in the form of adaptability and alignment (Cheng and Kesner, 1997, Gibson and Birkinshaw, 2004, Simsek et al., 2009). Overall, past studies regarding the role of slack management before, during and after the financial crisis has not sufficiently focused on organizational characteristics<sup>11</sup>.

Drawing from the organizational slack, organizational adaptation and organizational ambidexterity literatures, this study creates and analyse assumptions regarding the slack management of manufacturer companies, the adaptation capabilities necessary to balance efforts of alignment and adaptability phenomenon. The study also illustrates how firms are/are not able to balance and manage the process of slack generation and commitment when facing resource constraints.

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<sup>9</sup> Some relevant references are (Birkinshaw and Gibson, 2004, Birkinshaw and Gupta, 2013, Bouzdine and Dupouët, 2009, Diaz et al., 2016, Josephson et al., 2015, Raisch et al., 2009, Venkatraman et al., 2007)

<sup>10</sup> However, past literature has not sufficiently focused on the adaptation aspects of organizational slack. Little is known regarding how to use alignment /adaptability strategies, which are competitively advantageous in the presence of slack (Singh, 1986, Latham and Braun, 2009a).

<sup>11</sup> Organizational characteristic consists of a combination of three different dual concepts from the different but complementary perspectives: “*strategic slack vs operating slack*”; “*adaptability vs alignment*”; “*resource commitment vs resource flexibility*”. Specifically, the study posits that (a) strategic slack and operating slack complement each other, and (b) alignment and adaptability also complement each other, such that both resource commitment and resource flexibility as components of slack management indicate that they have significant implications on performance. The research also maintains that such relationships are fully mediated by environmental and risk-taking behaviours of firms. Conversely, it is argued that (c) *simultaneous ambidexterity* and *sequential ambidexterity* conflict with each other, such that the pursuit of simultaneous and sequential ambidexterity have also some important implications for firms’ performance. The study has some implications for slack management literature in the following ways: by providing a new perspective for extending an appraisal of the managing of the *alignment/adaptability tension*, stressing that the firms facing tension provide a motivating research opportunity, and signifying a need to search a composed mechanism to manage this tension successfully.

Such financially constrained environments imposes an undue burden on firms<sup>12</sup> (Klingebiel and Adner, 2015, Peteraf and Reed, 2007, DeSarbo et al., 2005, Koberg, 1987, Pauwels and Matthyssens, 2004). In a similar vein, although many past studies have examined the relationship of performance and excess resources (Tan, 2003, Daniel et al., 2004), the role of balancing resource accumulation and resource-commitment in slack management have been overlooked.

Furthermore, the study makes contributions to research by investigating how firms simultaneously or sequentially balance slack generation and slack commitment across three critical phases of a financial crisis, namely, the anticipatory (*pre-crisis*) phase, the responsive (*during the crisis*) phase, and the readjustment (*post-crisis*) phase (Meyer, 1982, Meyer et al., 1990, O'Neill et al., 2004, Marcus, 1988, Meier et al., 2013).

The study also distinguishes four forms of adaptation profiles: ambidextrous, adaptability-oriented, alignment-oriented and ambidextrous. From an organizational ambidexterity perspective, the present study examines whether and how these distinct profiles apply distinctive influences on a firm's performance, particularly, in terms of ambidextrous firms.

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<sup>12</sup> In this situation, firms begin to shift their slack utilization patterns, especially with reference to before, during and after a financial crisis (Uotila et al., 2009, Ben et al., 2016, Jalilvand and Kim, 2013, Reeves and Deimler, 2011, Thongpapanl et al., 2012). During this transformation period, the adaptation process is required to respond to the crisis (Lengnick and Beck, 2005, Patten et al., 2005, Weigelt and Sarkar, 2012).

## 1.2. Research Motivation and Background

A financial crisis is a time of significant external shocks to the markets and to the companies operating therein (Geroski and Gregg, 1997, Raastad, 2014, Morrison, 2011). In such a period, organisations are characterized by reduced resource scarcity, limited munificence and dynamism and deceleration in organizational activities that can have extensive influences on different industries (Goll and Rasheed, 2004, Tilcsik, 2014, Grewal and Tansuhaj, 2001, Raastad, 2014, Bradley et al., 2011b).

Prior studies have shown that major organizational renovation can arise during the financial crisis, resulting in diversity in company performance and that the industry settings are changed accordingly (Makkonen et al., 2014, Carbo et al., 2016, Geroski and Gregg, 1997). It is clear that as the financial crisis becomes entrenched, prior industrial choices undergo re-evaluation and commercial enterprises that fail to adjust to the new order, inevitably fail (Kraatz, 1998, Bradley et al., 2011a, Guha, 2016, Paeleman and Vanacker, 2015). Besides transforming the long-term industrial structure, a financial crisis also influences the short-term company environment (Arslan et al., 2014, Smart and Vertinsky, 1984).

However, a financial recession indicates an unpredictable major retrenchment in the amount of environmental demand, which may even be a short period of time (Chakrabarti, 2015, Dolmans et al., 2014, Meyer et al., 1990). Such retrenchments in environmental demand can seriously influence the firm's profitability due to financial crisis (Kogut, 1991, Kogut and Chang, 1991, Mascarenhas and Aaker, 1989, Bradley et al., 2011b, Patzelt et al., 2008).

Furthermore, the degree of misalignment to the existing environment often increases during the financial crisis (Van Der Vegt et al., 2015, Desai, 2016, Chen and Chuang, 2009, Corsaro and Snehota, 2011, Kaplan and Norton, 2006, Pearce and Michael, 1997). The degree of misalignment also depends on the duration and length of uncertainty.

Despite the fact that length and duration differ significantly, the timing of the financial crisis is very difficult to forecast (Raastad, 2014, Makkonen et al., 2014, Morrison, 2011, Geroski and Gregg, 1997). The possible increase in duration and length of uncertainty influences firms' decision-making seriously (Bigelow and Chan, 1992, Morrison, 2011).

Firms have to adapt to a new environment by sudden and drastic changes during this period of uncertainty (Lee et al., 2009, Makkonen et al., 2014, Agarwal et al., 2009, Meier et al., 2013, Tan and See, 2004). During the transformation period (i.e., during the crisis), possessing a higher level of slack may help firms to deal with difficulties and capitalize on new opportunities.

Specifically, resource flexibility enable firms to discern and benefit from new prospects to increase the firms' performance (Ben et al., 2016, Patel et al., 2013b, Sanchez, 1995, Sakhartov and Folta, 2014, Patel et al., 2015, Zajac et al., 2000, Mishina et al., 2004). Resource commitment, however, may inhibit the enhancement of firms' short-term profitability (Zajac et al., 2000, Rugman and Verbeke, 1998, Hodgkinson et al., 2014, Klingebiel and Adner, 2015, Singal and Jain, 2016). The question as to slack promotes or decelerates performance may be initiated by shifts in the environment (Bourgeois, 1981, Bowman et al., 2005, Dutta et al., 2016, George, 2005, Greenley and Oktemgil, 1998, Nohria and Gulati, 1996).

When the environment changes<sup>13</sup>, firms start to reconfigure their resources, manoeuvre their adaptation strategies and maintain them in readiness for existing capabilities that can acquire, assimilate, transform, and exploit resources by updating them to the latest environmental conditions when needed (Malhotra et al., 2005, Lele, 1992).

So as to minimize the time needed for adaptation, changing resource deployment from conventional to unconventional use, and thus reducing the switching cost use by means of substitution can enhance the sets of uses to which a resource can be employed, firms can increase the capacity of adaptation to meet the new environmental demand after uncertainty<sup>14</sup> (Sanchez, 1995, Ambrosini and Bowman, 2009, Trigeorgis, 1996, Evans, 1991, Pramanik et al., 2015, Stieglitz et al., 2015).

However, the environmental dynamism and munificence unleashed by coincidence and ambiguity produce threats and chance for creation of firm value (Zahra, 1993, Goll and Rasheed, 2004, Tilcsik, 2014, Bradley et al., 2011b). In addition, a higher dynamism in the environment reflects a greater level of nonlinear and unpredictable changes as well as relative instability in the industry (Stieglitz et al., 2015, Larrañeta et al., 2014, Schilke, 2014, Eisenhardt, 1989a, Eisenhardt and Martin, 2000, Withers and Fitza, 2017).

The greater degree of environmental munificence facilitates obtaining a greater level of a firm's growth (Goll and Rasheed, 2004, Anderson and Tushman, 2001, Baum and Wally, 2003, Rosenbusch et al., 2013). Conversely, environmental scarcity may minimize the growth opportunities (Li et al., 2014, Bottazzi et al., 2011, Chakrabarti, 2015, Mishina et al., 2004, Tong et al., 2008).

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<sup>13</sup> Environmental conditions have significant impacts on organizational functioning (Child, 1972).

<sup>14</sup> However, an organization's survival in the face of uncertainty depends on whether the organization can adapt to the shifting environment successfully. (O'Reilly and Tushman, 2008, Bradley et al., 2011a, Guha, 2016, Hill and Birkinshaw, 2014, Paeleman and Vanacker, 2015)

The environmental munificence influences resource-commitments, availability of financial resources and may stimulate slack generation behaviours (Kulkarni and Ramamoorthy, 2005, Ruiz, 2006, Keats and Hitt, 1988, Tilcsik, 2014, Oktemgil and Greenley, 1997). The experience of adaptation involves two sub-categories<sup>15</sup>. Chakravarthy (1982, 1986) called these *adaptive specialization and generalization* respectively.

The former is related to the firm alignment with its external and internal environments (Chakravarthy, 1986, Chakravarthy, 1982, Greenley and Oktemgil, 1998, Chakravarthy and Lorange, 1984, Thongpapanl et al., 2012). It is the process for enhancing the right fit (alignment) through the maximal use of the current environment to improve short-term performance reflected as generated *slack*<sup>16</sup>.

The latter, *adaptive generalization*, by contrast, is the method of capitalising on these slack resources in order to boost flexibility in the face of precarious and unfamiliar contexts, especially, enhancing the response capability in adjusting to both future risks and openings, while simultaneously gaining lasting developments in performance (Chakravarthy, 1982, 1986, Chakravarthy and Lorange, 1984, Greenley and Oktemgil, 1998).

Chakravarthy (1982, 1986) argues that both adaptive specialization (for improving *alignment* with the current environment) and adaptive generalization (for improving *adaptability* to future environments) need to be pursued *concurrently or simultaneously* as a continuous process for organizations to survive overtime<sup>17</sup>.

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<sup>15</sup> On the other hand, standard routines and repeatable firm activities may improve organizational learnings (Kang and Snell, 2009, He and Wong, 2004, Shimizu and Hitt, 2004). The consideration of replicability primarily explains strategies linking adaptive capabilities such as the processes of adaptation that should be subsequently measured in the context of a financial crisis (Makkonen et al., 2014, Ricciardi et al., 2016, Raj and Srivastava, 2016, Levinthal and Marino, 2015, Venkataraman, 1998, Wan and Yiu, 2009).

<sup>16</sup> Relevant references are (Venkataraman, 1989, Birkinshaw and Gibson, 2004, Gibson and Birkinshaw, 2004, O'Reilly and Tushman, 2008, O'Reilly and Tushman, 2013, Venkataraman et al., 2007, Tan and Peng, 2003, Greenley and Oktemgil, 1998).

<sup>17</sup> Related references are (Goossen and Bazazzian, 2012, Ambos et al., 2008, Birkinshaw and Gibson, 2004, Hodgkinson et al., 2014, Josephson et al., 2015, Lubatkin et al., 2006, O'Reilly and Tushman, 2013, Venkataraman et al., 2007).



Firms with such adaptation behaviour are basically acting in accord with the recommendations of organisational *ambidexterity* perspective of adaptation (Stettner and Lavie, 2014, Dubey and Gunasekaran, 2016, Kortmann, 2015). However, more uncertainty implies more risk surrounding the future outcome of a current decision (Anderson and Tushman, 2001, DeSarbo et al., 2005, Koberg, 1987, Tversky and Kahneman, 1992). In other words, it has been established that there is an efficient link between slack and risk-taking, suggesting that slack facilitates interaction between a firm and its environment and provides a buffer effect against a firm's risks.

The accumulation of internal excess resources impacts organizational capabilities to recognize new problems as risk or opportunity and, thus, affect the firm's adaptation process<sup>18</sup>. The changing conditions, however, in the environment appear to positively increase a firm's performance by increasing its level of resources available (O'Reilly and Tushman, 2008, Bradley et al., 2011b, Cheng and Kesner, 1997, Latham and Braun, 2009a, Wang et al., 2016a).

Firms with higher levels of excess resources enables firms to create options<sup>19</sup> (or flexibility) in a timely manner (Ford et al., 2002, Klingebiel and Adner, 2015, Martin et al., 2015, Sanchez, 1993, Trigeorgis, 1996, Bowman and Hurry, 1993). Consequently, the main topic that encourages researchers is to investigate the slack-performance relationship from the lens of organizational adaptation and the moderating effects of environmental munificence and dynamism and risk-taking behaviours, which surround a financial crisis<sup>20</sup>.

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<sup>18</sup> Related some references (Chatterjee and Hambrick, 2011, Miller and Lessard, 2001, Bourgeois, 1981, Cheng and Lin, 2012, Guha, 2016, Lin, 2014, Orlando et al., 2016, Su et al., 2009, Suzuki, 2016).

<sup>19</sup> These options then can be exercised during or after a (future) crisis to improve the goodness of fit between firm's interior operations and outer environment (Ansoff and Sullivan, 1993, Donaldson, 2000, Knoll and Jarvenpaa, 1994, Lengnick and Beck, 2005, Venkatraman and Camillus, 1984).

The researcher will also examine resource ambidexterity of firms by using the findings as a basis. Particularly, the study examines to what extent the link between slack and performance at the beginning of financial crisis affect its performance during and after a financial crisis, and how these shift to the same parameters based on factors outlined above during and after a financial crisis.

### 1.3. Research Gap

In the past, the association between slack and performance has been analysed from several perspectives in a variety of studies<sup>21</sup>. Here, these perspectives will be addressed briefly. The first perspective consists of studies that examine whether a suggested theory or concept contains a direct relationship between slack and performance.

Previous studies argued that the different forms and levels of firm resources has an impact on performance<sup>22</sup>. Additionally, apart from the effect of slack resources, the direct effect of a financial crisis has some significant implications on firm performance (Bradley et al., 2011b, Lee et al., 2009, Ma et al., 2014, Meier et al., 2013, Wan and Yiu, 2009). The first gap therefore in the literature is that firms are able to adopt different forms and levels of *slack* with varying performance implications before, during and after the financial crisis of 2007-8 that has so far, not been clearly examined.

The second perspective consists of studies investigating slack management as a firm's adaptation capacity and resource capabilities. Adaptation as a function of slack management represents organizational characteristics based on the characteristics of slack that differs from firm to firm and environment-to-environment<sup>23</sup>.

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<sup>21</sup> Some of these studies are (Pierce and Aguinis, 2013, Lin et al., 2009b, Geoffrey and Nohria, 2005, Arora and Dharwadkar, 2011, Wan and Yiu, 2009, Salge, 2011, Chen and Huang, 2010, Huang and Chen, 2010, Markóczy et al., 2013, Inoue et al., 2013, Stan et al., 2014, Goldstein and Iossifova, 2012, Kistruck et al., 2013, Mousa et al., 2013, Ruiz et al., 2008, Chen et al., 2013, Jifri et al., 2016, Liu and Fu, 2016, Marlin and Geiger, 2015a, DeCarolis et al., 2009, Banalieva, 2014, Lin, 2014).

<sup>22</sup> Some of these studies are (Banalieva, 2014, Geoffrey and Nohria, 2005, George, 2005, Jalilvand and Kim, 2013, Lin, 2014, Marlin and Geiger, 2015a, Orlando et al., 2016, Su et al., 2009, Vanacker et al., 2016, Wefald et al., 2010, DeCarolis et al., 2009).

<sup>23</sup> Some relevant references are (Bahrami and Evans, 2010, Busch, 2011, Chakrabarti, 2015, Chakravarthy, 1982, Stieglitz et al., 2015, Oktemgil and Greenley, 1997).

Adaptation is therefore vital to maintain competitiveness of firms <sup>24</sup> . However, the characteristics of slack are also fundamental to form different adaptation profiles in different environmental conditions. The *alignment* ( fit ) with the present environment and *adaptability* to changing (future) environments are sources of improved performances for businesses (Venkatraman et al., 2007, Oktemgil and Greenley, 1997, Chakravarthy, 1982, Powell, 1992, Kauppila, 2010, Eltantawy et al., 2016), yet both constructs have been found to be continuous rather than dichotomous in previous studies (Chakravarthy, 1982, Miles et al., 1978, Oktemgil and Greenley, 1997, Gibson and Birkinshaw, 2004).

Thus, a perceived gap in the prior studies are that organizations can adopt different degrees of *adaptability* and *alignment* with varying performance implications; this has so far, not been robustly investigated. This research gap is important for investigation as the two dimensions of organisational adaptation; both *alignment* and *adaptability* have fundamental tensions between them, (Cyert and March, 1963, March, 1991, Venkatraman et al., 2007, Parida et al., 2016, Eltantawy et al., 2016) making organisational adaptations problematic (He and Wong, 2004, Mitchell and Singh, 1993).

For example, successful *alignment* with the current environment may foster organisational inertia, and reduce business capabilities with a view to improving *adaptability* to tackle future environmental threats, and new opportunities, when the market changes (Hannan and Freeman, 1984).

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<sup>24</sup> Some relevant references are (Chakrabarti, 2015, DeFeis, 2015, Hutcheon, 2012, Kirkwood and Price, 2006, Kraatz, 1998, Levinthal and Marino, 2015, Pramanik et al., 2015, Sternad et al., 2011).

While alignment and adaptability represent two fundamentally different perspectives to organizational adaptation, this research has increasingly designated the need for a new slack typology to explain the link between excess resources and performance within the context of a financial crisis<sup>25</sup>. The reason is that, each time-period has unique environmental conditions<sup>26</sup>.

This uniqueness requires diverse levels of resource allocations contingent upon the degree of firms' resource flexibility and resource commitments<sup>27</sup>. This new typology recognizes environmental differences and fit between firm resources and environmental demands superbly. To fill this research gap<sup>28</sup>, this study seeks to form a new dichromatic slack typology applying to different environmental conditions and corresponding to resource allocations.

Organizational slack resources can be grouped under two main headings if looking from the viewpoint of a financial crisis: (1) operating slack and (2) strategic slack. While strategic slack can be attributed to most resource commitments during stable environments, operating slack can be principally attributed to resource flexibility during unstable time-periods. This important firm-level dichromatic slack typology<sup>29</sup> was also systematically analysed, compared and evaluated in terms of its different slack-performance relationship, such as linear, or curvilinear.

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<sup>25</sup> Some relevant references are (Bahrami and Evans, 2010, Chakravarthy, 1982, Hutcheon, 2012, March, 2003, Sternad et al., 2011, Stieglitz et al., 2015, Corsaro and Snehota, 2011, Inamdar, 2012, Powell, 1992).

<sup>26</sup> Some relevant references are (Azadegan et al., 2013b, Bradley et al., 2011a, Bradley et al., 2011b, Kirkwood and Price, 2006, Sharfman and Fernando, 2008, Stieglitz et al., 2015, Xue et al., 2013).

<sup>27</sup> (Chang et al., 2014, Gong and Shi, 2007, Singal and Jain, 2016, MacKinnon et al., 2008, Singh et al., 2013, Ruiz, 2006, Cheng and Kesner, 1997, Klingebiel and Adner, 2015).

<sup>29</sup> Proximities between slack types was analysed to show similarities and differences between two constructs. A synthesis of this proximity was also evaluated to explain the internal consistency of the adaptation processes, and level of alignment and adaptability, based on the level of slack.

The fourth perspective is related to risk-taking. Cyert and March (1963) and Singh (1986) specified that slack acts as a buffer to absorb external shocks. In addition, slack resources facilitate undertaking risky project when necessary (Bromiley, 1991, Torben, 2009, March and Shapira, 1987, Moses, 1992, Sharfman and Fernando, 2008, Singh, 1986, Tsai and Luan, 2016). Although highly dynamic environments increase the probability of failure, slack resources prompt managers to take risky initiatives and increased risk-taking capabilities<sup>30</sup>.

Thus, risk-taking indicates a critical aspect of slack management (Nohria and Gulati, 1996, Tan and Peng, 2003, Pierce and Aguinis, 2013). Such risk capabilities can also improve and increase managerial confidence (Chatterjee and Hambrick, 2011, Nohria and Gulati, 1995). Firms need to take these risky initiatives, often in environmental uncertainty, to capture existing opportunities, performance improvement or obtain better competitive position (Martinez and Artz, 2006, Sitkin and Weingart, 1995).

To test the moderating effect of risk-taking behaviours, it was anticipated that performance relative to aspiration level would curb the volatility between the excess resources<sup>31</sup> and performance. Although there are assumptions that high performing entities are more liable to possess more slack capabilities when comparing low performer firms (Chakravarthy, 1986, Chakravarthy, 1982, Cyert and March, 1963, Singh, 1986, Greenley and Oktemgil, 1998), empirical findings regarding such an argument are quite limited in the literature. Chakravarthy (1986) classified and compared firms as excellent and non-excellent firms or high performers and low performers (Greenley and Oktemgil, 1998).

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<sup>30</sup> Some relevant references are (Bourgeois, 1981, Daniel et al., 2004, Shahzad et al., 2016, Singh, 1986, Vanacker et al., 2016, Wang et al., 2016a, Wefald et al., 2010, Zona, 2012).

<sup>31</sup> The threat rigidity theory and prospect theory explain how slack gains affect risk taking and produce mixed results, indicating negative effects in some researches and positive effects in others (Shimizu, 2007, Chattopadhyay et al., 2001, Fiegenbaum et al., 1996, Singh, 1986, Greve, 2011, Raval and Ojha, 2014).

It is also commonly accepted that comparing firms' performance from the different perspectives will increase the validity and reliability of research (Venkatraman and Ramanujam, 1986, Hitt and Tyler, 1991). Several measures and factors have been used in the literature to investigate performance differences. However, there are insufficient studies using the 'Altman z-score' as a criterion for performance. The Z-score is an important variable because it uses leverage, profitability, solvency, liquidity, and activity to measure whether an organization has an increased level of probability of becoming bankrupt (Altman, 1968, Chakravarthy, 1986, Ferrier et al., 2002, Koh et al., 2014).

In agreement with Chen and Miller (2007), firms can be categorized as "high performers" and "low performers" based on their level of the 'Altman z-score' and that this framing provides further confirmation to measure the current major slack-performance relationship difference for firms. The Z-index has also something in common with performance and risk-taking (Nadkarni and Narayanan, 2007, Karaevli, 2007, Swift, 2015, Kuusela et al., 2016, Chen and Miller, 2007).

In this respect, comparing firms as 'high and low performers' based on 'Altman's Z-score' from the perspectives of slack management and risk-taking behaviours can be considered as another contribution to the slack-performance relationship. Furthermore, the risk-taking capacity view was employed to assess the causes of risk-taking behaviours.

Risk-taking capabilities can be gathered under three components; strategic risk index, return risk and operating risk<sup>32</sup>. Given the risk factors defined above, how firm performance is influenced, and the specifically the moderating effect of the strategic risk index and operating risk index, on the performance relationship, was examined.

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<sup>32</sup> (Lim and Mccann, 2013, Figenbaum and Thomas, 1986, Cool et al., 1989, Nickel and Rodriguez, 2002, Miller and Bromiley, 1990, Alessandri and Khan, 2006, Das and Teng, 2001).

Although these three risk factors were studied before, any of the empirical research had been examined on risk in the context of slack management, performance comparison (high performer vs low performer) and financial crisis. As a fifth perspective, the financial crisis can not only distinguish different levels of environmental munificence and dynamism in different periods, but also determine their impacts on the slack - performance relationship<sup>33</sup>.

Further, firms' response to environmental uncertainty is also influenced by the change in environmental dynamism and munificence between stable and unstable periods<sup>34</sup>. However, such an influence is particularly likely to be severe for firms with low munificence in a dynamic environment that leads to temporal adaptability<sup>35</sup> (Feng et al., 2017, Martínez et al., 2014, Cai et al., 2016, Weinzimmer et al., 2015, Chen, 2015b, Kolev, 2016). This perceived gap is to evaluate whether environmental conditions interact significantly with adaptational slack resources as determinants of firm performance<sup>36</sup>.

To do so, a parsimonious model was developed and tested that ascertains the function of environmental munificence and dynamism as an exterior mediating effect through which managerial adaptation perceptions affect firm performance. Additionally, these two contingencies<sup>37</sup> were also examined in terms of if there is a curved link between adaptational slack and performance (Tan, 2003, Tan and Peng, 2003).

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<sup>33</sup> Some relevant references are (Goll and Rasheed, 1997, Baum and Wally, 2003, Park and Mezias, 2005, Palmer and Wiseman, 1999, Jansen et al., 2012, Bradley et al., 2011a, Fernhaber and Patel, 2012, Karim et al., 2016, Kunsch et al., 2016, Azadegan et al., 2013a, Pang et al., 2011).

<sup>34</sup> (Anderson and Tushman, 2001, Ansoff and Sullivan, 1993, Cheng and Kesner, 1997, Child, 1972, Kraatz and Zajac, 2001, Lengnick and Beck, 2005, Stieglitz et al., 2015, Wan and Yiu, 2009, Wang et al., 2016a).

<sup>35</sup> Thus, the effect of environment and its interaction effect on adaptational slack and then on firm performance, have also some significant implications in relation to firm performance; and whether this relationship is linear or curvilinear, is also a matter that should be investigated (Bradley et al., 2011b, Stan et al., 2014, Tan, 2003).

<sup>36</sup> Some relevant references are (Chen, 2015b, Goll and Rasheed, 2004, Bourgeois, 1981, Geoffrey and Nohria, 2005, Lee, 2015, Morrison, 2011, Nohria and Gulati, 1996, Nohria and Gulati, 1995, Orlando et al., 2016).

<sup>37</sup> Those operating at the technological frontier often found it more efficient to do their processes in-house away from the lingering fashion of the last three decades when firms focused on their core businesses and contracted out everything else to specialists. Those not able to make the transition and as have been pointed out (Porter, 1980, Porter, 1985) aiming to follow variegated tactics, may miss the positive results of any one of these approaches. This presents a dilemma as far as organisational adaptation is concerned: over-commitment to *alignment* can compromise the future of the firm; and overindulgence in *adaptability* to a severe profit crisis in the short run



The final perceived gap in the literature is resource ambidexterity. On the other end of the scale, entities which over-compensate in terms of eagerness to change are liable to experience the ill-effects of this over-readiness and possibly miss the positive outcome (March, 1991). There is support in the literature that the most successful organizations reconcile both adaptability and alignment and pursue these simultaneously, or concurrently, and in doing so, enhance their long-term competitiveness with ambidexterity<sup>38</sup>.

While *alignment* or *adaptability* has performance benefits, balancing the two is difficult and this contradicts the recent research on ambidextrous firms that pursue both with performance gains (Mithas and Rust, 2016, Zhang et al., 2016b). Despite these contradictory arguments on organisational adaptations, there have been no first-hand scrutiny using empirical data to gauge the extent of alignment and adaptability of firms and their performance differences.

A synopsis of relevant empirical studies from these factors is given in Table 1.1, aimed at highlighting the lacunae in research. The illustrated samples in Table 1.1 serve to query the link between performance and excess resources in the context of organizational characteristics, environment, risk-taking behaviours and financial crisis.

On the horizontal axis, the Table 1.1 represents the environmental jolt investigated, as well as adaptation, risk-taking, environmental munificence and dynamism, ambidexterity, the curvilinear relationship and comparison of high and low performer firms. The above-mentioned factors with subsequent developments within the literature are together widely reviewed in the next section. The hypothetical views of performance determinants illustrated, were indicated by check marks, for each case in Table 1.1.

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(Kuusela et al., 2016, Kulkarni and Ramamoorthy, 2005, Ruiz, 2006, Birkinshaw and Gibson, 2004, Raisch et al., 2009).

<sup>38</sup> (Kortmann, 2015, Birkinshaw and Gibson, 2004, Kortmann et al., 2014, Birkinshaw and Gupta, 2013, Goossen and Bazazzian, 2012, Tushman et al., 2010, Eisenhardt, 1989b, Bourgeois III and Eisenhardt, 1988).

The synopsis table portrays that despite its major components, the existing evidence on determining factors in relation to execution, specifically during a period of financial upheaval is seriously deficient to the extent that one questions the validity of the results. In the studies mentioned in Table 1.1, the first notable shortcoming can be defined as fragmentation.

The empirical studies illustrated in Table 1.1 are generally rooted in a few theoretical perspectives. Specifically, they tend to concentrate on a functional area within the firm, such as innovation or performance<sup>39</sup>. This suggests that a different range of relevant facts are investigated and analysed in isolation (Morrison, 2011, Raastad, 2014).

In addition, different components are often gauged employing the same fundamental variables (Table 1.1 does not illustrate these). Although financial crises are a common thread, the existing literature hence is seen as fragmented. This criticism has been expressed recurrently and has been uttered repeatedly within management literature (Ketchen Jr et al., 2008, Pettigrew et al., 2001, Morrison, 2011).

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<sup>39</sup> Some relevant references are (Pearce and Michael, 1997, Srinivasan et al., 2005, Morbey and Dugal, 1992, Latham and Braun, 2008, Wan and Yiu, 2009, Morrison, 2011, Chen and Huang, 2010, Geiger and Gashen, 2002, Geiger and Makri, 2006, Greve, 2003, Huang and Chen, 2010, Lee, 2015, Marlin and Geiger, 2015b, Mousa and Chowdhury, 2014, Murro et al., 2016, Nohria and Gulati, 1996, Ruiz et al., 2008, Wang et al., 2016a)

### Overview of Relevant Empirical Studies from most cited articles relative to slack-performance relationship

Author(s), Year	Type of Study	Environm. Jolt	Adaptation	Risk-Taking	High/Low Per.	E.Munificence	E. Dynamism	Ambidexterity	Curvilinear
Jifri et al., 2016	Empirical	●	●	●	●	●	●	●	●
Liu and Fu, 2016	Empirical	●	●	●	●	●	●	●	●
Marlin and Geiger, 2015a	Empirical	●	●	●	●	●	●	●	●
Banalieva, 2014	Empirical	●	●	●	●	●	●	●	●
Wen-Ting Lin, 2014	Empirical	●	●	●	●	●	●	●	●
Markóczy et al., 2013	Empirical	●	●	●	●	●	●	●	●
Kistruck et al., 2013	Empirical	●	●	●	●	●	●	●	●
Mousa et al., 2013	Empirical	●	●	●	●	●	●	●	●
Yi-Min Chen et al., 2013	Empirical	●	●	●	●	●	●	●	●
Goldstein and Iossifova, 2012	Empirical	●	●	●	●	●	●	●	●
Arora and Dharwadkar, 2011	Empirical	●	●	●	●	●	●	●	●
Salge, 2011	Empirical	●	●	●	●	●	●	●	●
Peng et al., 2010	Empirical	●	●	●	●	●	●	●	●
Yi-Fen Huang and Chen, 2010	Empirical	●	●	●	●	●	●	●	●
Chung-Jen Chen and Huang, 2010	Empirical	●	●	●	●	●	●	●	●
Lin et al., 2009b	Empirical	●	●	●	●	●	●	●	●
Su et al., 2009	Empirical	●	●	●	●	●	●	●	●
Wan and Yiu, 2009	Empirical	●	●	●	●	●	●	●	●
Ju and Zhao, 2009	Empirical	●	●	●	●	●	●	●	●
De Carolis et al., 2009	Empirical	●	●	●	●	●	●	●	●
Geoffrey Love and Nohria, 2005	Empirical	●	●	●	●	●	●	●	●
Source: Web of Science		●		Examined		●		Not Examined	

Table 1-1- Past empirical studies relative to slack-performance relationship

#### 1.4. Research Objectives

The goal of this study is to tackle some of limitations of extant literature by taking broader standpoint of the determinants of firm's performance heterogeneity before, during and after financial crisis of 2008-09. Hence, the aims of this thesis are to investigate the connection between slack and firm performance through slack management process (adaptability and alignment processes), and the possible moderating roles of risk-taking capabilities (specifically, strategic risk and operating risk; high and low performers), and environmental conditions (industry factors; dynamism and munificence) variables. More specifically, the study intend:

- i) to scrutinize the connection between slack and performance, prior to, throughout and post a financial crisis.
- ii) to determine if the adaptation processes of alignment and adaptability are distinct constructs for manufacturer firms
- iii) to elucidate whether alignment and adaptability are in harmony and mutually supporting, or are substitutes
- iv) to demarcate the essence of the connections between alignment and performance, and between adaptability and implementation
- v) to decide whether the slack-performance link is regulated by industry elements such as dynamism and munificence
- vi) to determine if the behaviours of strategic risk and operating risk are distinct constructs for manufacturer firms
- vii) to determine whether the slack-performance relationship is moderated by risk-taking capabilities such as strategic risk and operating risk
- viii) To clarify if the high performer and low performer firms have different degrees of slack and performance before, during and after financial crisis
- ix) To investigate resource ambidexterity, whether any significant differences exist in and between simultaneous and sequential ambidexterity

The overall objective of the study, can thus be described as follows:

*“The overall goal of this study is to investigate firms’ slack management and their implications on company performance before, during and after the recent financial crisis of 2007-8.”*

In order to enlarge this general objective into manageable sections, it is offered as the seven following research objectives. The limitation of the current management literature is that it is a fragmented structure. This shortcoming can be solved by integrating the determinants of slack-performance relationship employed within the literature. Additionally, the general perspective is widened to contain other factors from the overall organisation slack literature, as the diverse approaches have created a great variety of measurements . Therefore, a limited number of studies have been considered when variables were being specified (Chakravarthy, 1982, Greenley and Oktemgil, 1998).

However, three dichromatic and opposite perspectives were adopted, in general, to explain the slack- performance relationship; resource-based view versus resource constraint theory; behavioural theory versus agency theory; and prospect theory versus threat rigidity theory. Therefore, once a number of potential determinants is established based on these perspectives, the first research objective is to test them empirically in order to draw comparisons with time periods, and address why the specific variables seem to matter.

The first objective of this research is related to the philosophy that two opposite research perspectives related to form and level of resources is better than a single perspective approach (Raastad, 2014, Morrison, 2011). In fact, this dichotomised perspective enables empirical studies to investigate the slack-performance relationship more deeply.

This interpretation originated in resource allocation researches, which have reported different views needed to address firm performance. To address better firm performance, the environmental changes, as well as risk-taking capabilities, in addition to specific resource allocation, have been investigated (McGahan and Porter, 2002). Additionally, it is important to identify firms' situations before the financial crisis in order to improve firm performance as well as respond to environmental uncertainty in the most appropriate way (Pearce and Michael, 1997).

From this perspective, this study correlates classic the 'resource constraints literature' (RCT) (suggests an approach of "less is more") and resource-based theory (RBV) (suggests an approach of "more is better"). Drawing on the RTC and the RBV, how distinct forms and different levels of excess resources impact performance before, during and after a financial crisis, were examined.

The first research objective hinges upon encompassing those variables that have been considered most fundamental within organizational characteristic as well as within research aimed at a financial crisis:

- 1) The first research objective is to investigate the direct connection between slack and performance before, during and after financial crisis from the perspective of RBV and RCT.

A perceived gap in the literature is that organizations can adopt diverse degrees of *adaptability* and *alignment* with varying performance implications that has so far, not been robustly investigated.

This formulation of company tactic as a particular model or effort to resource exploitation lays the foundation for amalgamating the two opposing views of slack in organizational adaptation processes. Despite these contradictory arguments on organisational adaptations, fact-based studies using comparison deviation measurements into the extent of alignment and adaptability of firms and their performance differences.

By comparatively investigating the levels, patterns and composition of the alignment, adaptability and performance variables of firms before, during and after a hypothetical crisis, it is possible to examine how disruptive the crisis was, and whether the impact was inimical, benign, or mixed, in terms of organisational adaptations. At this stage, determining and reducing the number of adaptation profiles, and complexity, in relation to several dimensions, namely, by relying on tested, empirically-founded theories, and the variables considered, and also differentiating by firm performance, these should yield some practical implications for future consideration:

The second, third and fourth objectives of this study are:

- 1) to decide if the process of adaptation of alignment and adaptability are manifest concepts in the case of manufacturing firms
- 2) to elucidate whether alignment and adaptability are in harmony and reciprocally strengthening, or alternatives
- 3) to define the form of the association between performance, and adaptation processes (e.g., alignment and adaptability).

The implication of adaptation on firm performance during the environmental jolts depends on the level of slack and its allocations (Pinsonneault and Kraemer, 2002). This idea suggests that adaptational slack is different from other forms of excess resources and more particularly that distinct forms of excess resources can be reallocated regardless of the time difference.

Perceptual choice of accumulating adaptational slack determine level and form of slack resources<sup>40</sup>(Nohria and Gulati, 1996). However, when identifying adaptational slack resources, different time-periods and environmental conditions are generally considered (Latham and Braun, 2008, Wan and Yiu, 2009). However, using the current literature on slack management and its reallocation, this clue was further investigated by classifying distinct forms of slack. In this study, a classification according to form is recommended; accordingly, adaptational slack is separated into based on level and forms of slack and different time-periods. Adaptation and adaptation slack were examined from the viewpoint of BTF and AT.

Therefore, the fifth objective of this study is:

- 4) to clarify whether strategic slack and operating slack are distinct and complementary constructs.

This study also outlines slack-performance relationship moderated by the level of environmental munificence and dynamism. It is important to evaluate whether environmental conditions interact with slack as joint determinants of firm performance. Organizational theory (OT) suggests concepts of environmental munificence and dynamism (McArthur and Nystrom, 1991, Jansen et al., 2012).

These concepts are applied to resource allocation strategies, the rapport between slack and firm performance. Studies in both economic and organizational theory have identified this context as a significant element to consider when seeking understanding relationships between slack and performance (George, 2005, Barreto, 2012, Chrisman and Patel, 2012, Desai, 2016).

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<sup>40</sup> Perceptual choice is related to how firms perceive slack resources. In literature, scholars argued that whether excess resources is a facilitator or inhibitor for performance (Nohria and Gulati., 1996). In similar vein, Slack was also considered as *good and bad* or slack as *source of flexibility* or *source of risk*. According to *BTF* and *agency theory*, the '*perceptual choice*' determines at what type of slack resources should be accumulated.



Prior studies indicated that environments are an important consideration for slack-performance relationship (Bradley et al., 2011b, Chen, 2015b, Eisenhardt, 1989b, Martínez et al., 2014, Stieglitz et al., 2015).

Therefore, the fifth objective of this study is:

- 5) to conclude whether slack-performance relationship is moderated by environmental conditions, (e.g., dynamism and munificence)

In concluding the above, the research aims to contemplate the specific characteristics of distinct kind and point of slack. As previously indicated, past studies on how ex-ante firm performance affects adaptation behaviours during and after a financial crisis were not clear and have led to conflicting conclusions, without taking account of risk-taking behaviours (Kuusela et al., 2016, Deb et al., 2016, Tsai and Luan, 2016).

Regarding this issue, different perspectives give different results<sup>41</sup>. A firm's environmental conditions dictates organizational risk, which in turn, influences the varying degrees of slack resources (Bromiley, 1991, Singh, 1986, Tsai and Luan, 2016, Shimizu, 2007). The moderator effect of risk must be analysed and tested in context of slack-performance relationship. Therefore, next objective of this research is:

- 6) to decide if the activities of strategic risk and operating risk are distinct constructs for manufacturer firms
- 7) to establish whether these relationships are moderated by risk-taking dynamics such as strategic risk and operating risk

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<sup>41</sup> Prospect theory, for example, illustrates that low performance prompts assertive behaviour in the midst of a crisis, while threat-rigidity theory forecasts the contrary (Shimizu, 2007, Zona, 2012). Furthermore, resource-based view foretells that slack resources offer the methods which accomplish flexibility in producing strategic choices for firm risks (Lecuona and Reitzig, 2014, Huesch, 2013).

Some firms adapt to new environment very swiftly; others much more lethargically<sup>42</sup> (Busch, 2011, Chakrabarti, 2015, DeFeis, 2015, Pramanik et al., 2015, Bahrami and Evans, 2010). Literature review posits that resource position<sup>43</sup>, exploration and exploitation activities, risk and operational preferences should have implications on firms' profitability (Oppen et al., 2016, Vanacker et al., 2016, Sun and Price, 2016, Stan et al., 2014, Mudambi and Swift, 2014, Li et al., 2014). It is expected that level and form of slack resources differs across industries and it is also expected to vary between high and low performer operations (Matsuno and Mentzer, 2000, Chen and Miller, 2007, Daniel et al., 2004).

Specifically, firms develop unique resources and adaptation mechanisms; that these mechanisms (or processes) maintain patterns of changes in combined actions; and that these patterns in turn shape high and low performer firms' profitability. The sixth of goal of this research is to name, match, and contrast the dissimilarities in slack management associated with resource position among high and low performer firms before, during and after financial crisis. Therefore, sixth goal of this research is:

- 8) to assess high performer and low performer firms and find out main differences in terms of level of slack in before, during and after financial crisis

There is support in the literature that the most successful organizations reconcile both adaptability and alignment and pursue these simultaneously, or concurrently, and in doing so, enhance their long-term competitiveness, with ambidexterity (Hodges and Gill, 2014, Birkinshaw and Gupta, 2013, Papachroni et al., 2015).

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<sup>43</sup> It was contested that the firms' resource position plays a role by constraining and shaping their adaptation strategies when the environment changes (Grant, 1991, Galbreath and Galvin, 2004, Nickerson et al., 2001, Perry, 2016).

While *alignment* or *adaptability* has performance benefits, balancing the two is difficult and this conflicts with the recent research on ambidextrous firms that pursue both with performance gains (O'Reilly and Tushman, 2013, Zhang et al., 2016a). However, ambidexterity can be conditional on the accessibility of adequate organizational slack (Jansen et al., 2012, Jansen et al., 2006). Firms who have the resources available to simultaneously explore and exploit will have a less difficult time attaining ambidexterity (Kauppila, 2010, Kortmann et al., 2014, Dunlap et al., 2016). This final objective aims to contribute empirically to the overall corpus of adaptability-alignment examination and in particular to the notion of ambidexterity. It also attempts to reveal what impact ambidexterity has on financial performance and how ambidextrous organizations engage in alignment and adaptability activities.

The seventh analytical research objective is to:

- 9) investigate resource ambidexterity, whether any significant differences exist between simultaneous and sequential ambidexterity

To sum up, this dissertation develops the established consensus that performance heterogeneity alters before, during and after a financial crisis. In order to appreciate this phenomenon, it examines the organisational adaptation mechanisms of firms by comparing their organisational slack management and performance differences. It also examines that which firm characteristics at the beginning of a financial crisis decide its ensuing firm financial performance during such a crisis, and which changes in these characteristics during a financial crisis determine the subsequent firm financial performance in the post-crisis period. The measures and evaluations will be categorised depends on firm performance to assist the perspective that firms which follow a different adaptation profile may not share the same preconditions. Finally, the discussion of the research results end in a set of practical implications.

### 1.5. Research Question

The study investigates the connections between organizational slack and performance heterogeneity. Organizational characteristics, risk-taking capabilities, and environmental conditions are the potential main factors that are believed to influence the slack –performance heterogeneity relationship. Chakravarty (1982)'s adaptation model, Miller and Bromiley (1990)'s strategic risk model, Bradley (2011)'s model related to environmental condition and Venkatraman (2007)'s simultaneous and sequential ambidexterity model were the key concepts that were used to understand and test such a relationships. The statistical and theoretical nature of these relationships will be elaborated upon in Chapters 2, 3, 4 and 5, respectively. Those concepts and constructs have not overtly been allied in the previous studies thus far. The research aims to amalgamate these components into a harmonious whole, providing up-to-date literature towards answering research question.

Reframing this poses the research question:

***Research Question:***

***How do companies manage their slack resources and their implications on company performance before, during, and after financial crisis?***

The aim here is to appreciate how these concepts interrelate to clarify whether slack contributes or inhibits firm performance; in addition, to understand whether slack is a source of flexibility or a source of risk. This study will investigate different level of slack and performance relationship as they affect each other in the different environmental conditions. It is further thought that possessing a higher level of slack means within an organization will produce greater level of performance.

## 1.6. Thesis Structure

This thesis has six chapters. It starts with the chapter 1, which includes, research motivation and background, research objectives, research goals, research question and thesis structure, respectively. Chapter 2 will offer a synopsis of the core concepts employed, particularly, organizational slack and organizational adaptation as a potential shaping factor on slack management process and moderators (e.g., risk-taking capabilities and environment). Chapter 3 provides an exhaustive reviews on the process of adaptation (e.g., alignment and adaptability), adaptational slack, resource capabilities, risk capabilities, environmental munificence and environmental dynamism, which are particularly relevant when assessing how different slack-profiles affect performance profiles through the adaptation process. The chapter will end with the proposition of a model of the slack management process, upon which the succeeding analysis will be based. In Chapter 4, the research methodology is examined. Principally, it mostly presents a controversy of the data analysis of the research. Chapter 5 provides results, as well as the challenges related to interpreting the hypotheses. Chapter 6 offers a discussion of the theoretical and executive repercussions of the thesis. Chapter 6 presents the conclusion of this thesis. The model below outlines the general structure of the thesis (see Figure 1.1).

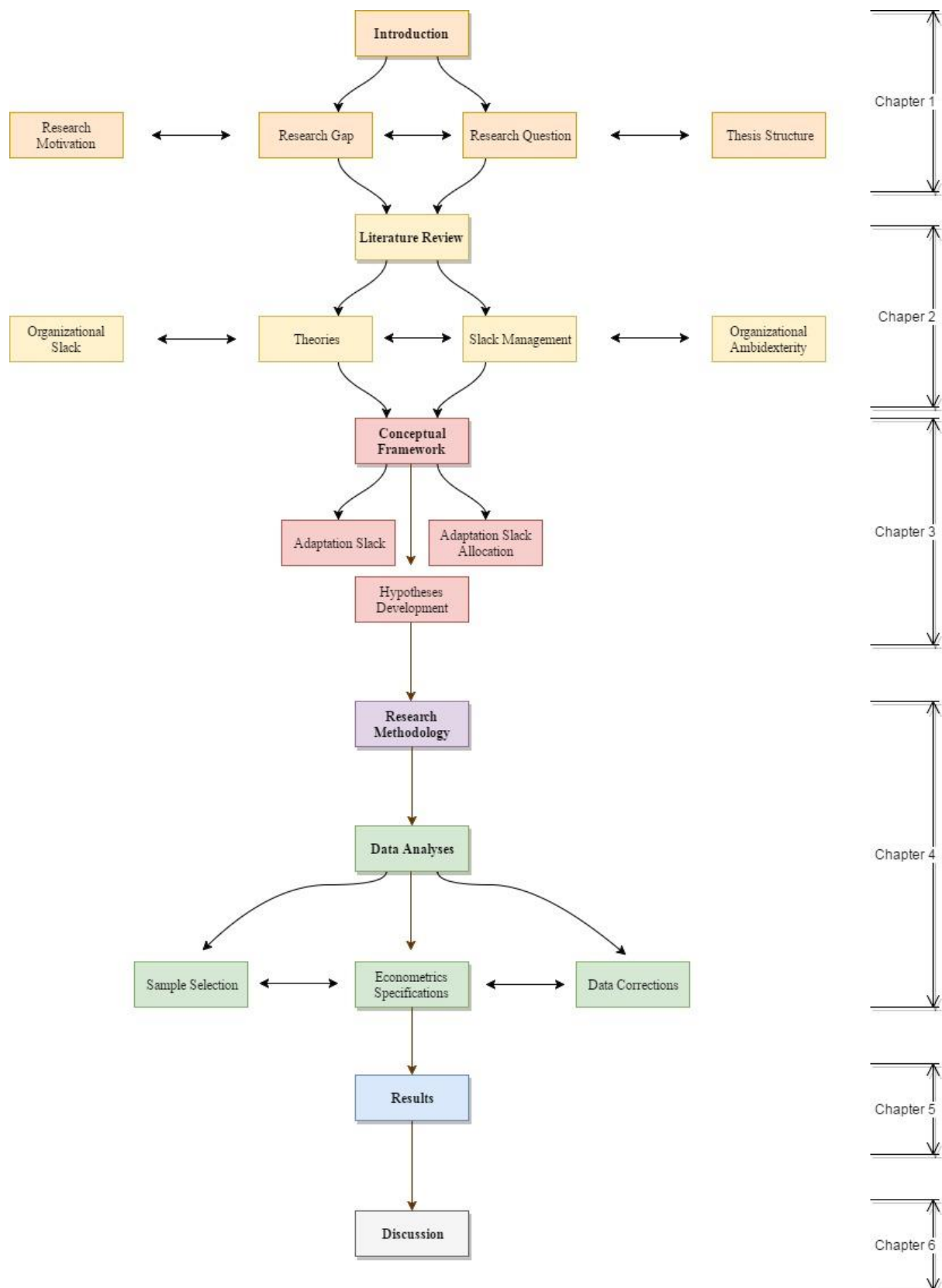


Figure 1-1- Thesis Structure

### 1.7. Theoretical, Practical and Policy Implication of Research

The findings contribute to existing theories and practice in several ways. First, the thesis suggests a more parsimonious understanding of slack-performance relationship in the context of financial crisis: the provision and monitoring of change on forms and levels of slack resources. Second, the thesis identifies weakness of adoption of uni-theoretical (pure theories) perspectives and studies provide an initial integration of the theories to the research of slack and firm performance. Third, the thesis develops propositions about how firms adjust their slack resources in response to financial crisis by varying performance implications.

The integration of different perspectives regarding slack-performance relationship provide insight into past empirical studies, has implications for practice, and provides a number of opportunities for future research. Broadly speaking, the thesis highlights the need for the development and applications of slack management on slack-performance relationship.

## 1.8. The Novelty of This Research

The key contribution of this thesis is that it proposed to shed light on why and how the management of slack have empirically and theoretically evolving in context of financial crisis, what related factors it has been mainly addressed. The existing management literature does not provide any direct empirical evidence regarding slack-performance relationship from the context of before, during and after financial crisis.

The thesis is original in its examining of the effect of slack management on firm performance in context of financial crisis of 2008-09. Another originality of this thesis is that it explains this relationship empirically from the perspective of organizational adaptation and organizational ambidexterity at firm-level data. The study also combines RBV, RCT, BTF, AT, PT, and TRT perspectives, highlighting their applicability to slack management across varying performance implications before, during and after financial crisis. The thesis also contributes to past studies by providing a clear explanation of the impact of adaptation process on firm performance measures of both alignment and adaptability through a comprehensive empirical study.

The thesis also provides several ideas for managers on how to achieve organizational ambidexterity between processes of alignment and adaptability. Another novelty of this thesis is to examine ambidexterity in detail by employing constructs of alignment and adaptability from the perspective of organizational slack. Thesis tries to evidence that European manufacturing firms have various adaptation processes, profiles and risk-taking behaviours with varying performance implications based on their slack management in response to financial crisis.



## Summary

This chapter has explained the general perspectives regarding research motivation, gaps and objectives. It has briefly described the research background, specifically identified three key factors that are believed to influence the slack-performance relationship; organizational characteristics (resource capability and adaptation capacity), risk-taking capabilities (strategic risk, return risk, and operating slack) and environmental conditions (environmental jolt, environmental munificence, and environmental dynamism). The nine specific research objective of the study were also, outlined, briefly. This chapter concluded by framing the structure of the rest of the thesis, including the synopsis of the empirical parts.

# Chapter 2

## Introduction

The earlier chapter presented an outline of the study. In this chapter, the views of relevant literatures and theories are introduced. Thus, this chapter establishes the foundation from which the research proposition originated. This chapter starts by introducing definitions of slack, and later continues with several relevant theories, which form the main theoretical basis of the study. The key organizational characteristics, risk-taking capabilities and environmental conditions that are the sources of slack management are identified. Next, the important role of slack resources in achieving outstanding firm performance, in a turbulent environment, is debated. Four important adaptation profiles are named. Their importance on firm performance is discussed, and the mediating role of adaptation and risk-taking behaviours in the slack-performance relationship is proposed. Lastly, their importance on establishing ambidexterity is also debated.

## 2. Theoretical Background

### 2.1. Literature Review

#### 2.1.1. Organizational Slack

The concept of slack was predominantly employed in the organizational theories, economics theories and strategic management literature<sup>44</sup>, in general. Specifically, management theories suggest a different relationship in between organizational outcomes and slack resources, such as, survival, growth, innovation and performance (Jifri et al., 2016, Cyert and March, 1963, Venkatraman et al., 2007, Miller and Bromiley, 1990).

Organizational slack is a polymorphous and multi-dimensional concept involving both the external and internal excess resources (Jifri et al., 2016, Wan and Yiu, 2009). In general, two main research streams underlie the studies on organizational slack, the innovation and slack relationship and the performance and slack relationship (Marlin and Geiger, 2015b, Marlin and Geiger, 2015a, Marlin, 2014).

Cyert and March (1963) argued that excess resources could be used to align (or fit) internal resource commitments and external environmental demands by acting as a buffer to absorb external environment pressure and to solve internal conflicts. The most cited studies regarding slack-performance relationship were demonstrated in Table 2.1 as follow:

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<sup>44</sup> Some related references are (Azadegan et al., 2013a, Bourgeois, 1981, Cheng and Lin, 2012, Daniel et al., 2004, Dutta et al., 2016, Lin, 2014, Marlin and Geiger, 2015a, Mousa and Chowdhury, 2014, Mousa and Reed, 2013, Sharfman et al., 1988, Singh, 1986, Tan, 2003, Vanacker et al., 2016).

Authors	Slack definition	Sample	Resource position (type of slack)	Theories	Findings
Tan, J; Peng, MW, 2003	Slack buffers a firm's technical core from environmental turbulence, and thus enhances its performance	Survey in a single industry	Absorbed and Unabsorbed	Behavirol theory and Agency theory	Our identification of a curvilinear relationship between slack and performance.
Pierce, Jason R.; Aguinis, Herman, 2013	Slack provides continually adapt their strategies to survive and thrive in their everchanging dynamic environments.	NA	NA	Behavirol theory and Agency theory	TMGT effect as a meta-theoretical principle that allows us to account for and make sense of an increasing body of apparently paradoxical, countertheoretical, and seemingly anomalous empirical findings across management subfields
Daniel, F; Lohrke, FT; Fornaciari, CJ; Turner, RA, 2004	Slack is defined as “the difference between total resources and total necessary payments”. slack is a resource cushion that firms can use in a discretionary manner, both to counter threats and exploit opportunities.	NA	Available, recoverable, and potential slack	resource-based view and behavioral theory	Results provided evidence of a positive relationship among all three slack types (i.e., available, recoverable, and potential) and financial performance and showed that studies controlling for industry-relative performance demonstrated a stronger positive potential slack – performance relationship than those not including these controls
Lin, Zhiang (John); Peng, Mike W.; Yang, Haibin; Sun, Sunny Li, 2009	Organization slack may assist managers pursuing acquisitions by allowing greater financial discretion	Electronics industry;SDC Platinum database; period of 2001–2005	Available slack; recoverable slack	resource dependence theory	Our findings show that there are indeed important learning and network factors that lead to M&As. More interestingly, the impact of such learning and network factors varies sharply across countries with different market-based institutions
Love, EG; Nohria, N, 2005	Resources in excess of those required to produce necessary outputs	Compustat; period of 1977 - 1993	Absolute absorbed slack; relative absorbed slack	behavioral theory	We find broad support for our hypotheses that downsizings are more likely to lead to improved performance when firms have high slack, when their scope of the downsizing is broad, and when the downsizing is done proactively.
Arora, Punit; Dharwadkar, Ravi, 2011	Organization slack, an important behavioral theory construct, signifies the exist-ence of a “cushion of actual or potential resources” that enables the firm to adapt to internal or external necessities for strategic change	KLD Domini 400 Universe; period of 2000-2004	Available slack; potential slack	behavioral theory	we find that the association between effective corporate governance and both positive and negative CSR depends on satisfaction with firm performance as indicated by the levels of slack and attainment discrepancy.
Peng, Mike W.; Li, Yuan; Xie, En; Su, Zhongfeng, 2010	Organizational slack represents potentially utilizable resources that can be redeployed to achieve the firm's goals	China Stock Market Accounting Database; period of 2004-2005	Unabsorbed slack	N/A	Findings suggest that there is a positive relationship between organizational slack and firm performance, and that CEO duality negatively moderates this relationship in SOEs, but positively in POEs.
Su, Zhongfeng; Xie, En; Li, Yuan, 2009	Organizational slack can be used to support innovations, facilitate strategic behaviors, and thus enhance firm performance	China Stock Market Accounting Database; period of 2004-2006	Unabsorbed slack	resource-based view; institutional theory	we find that unabsorbed slack is critical for firms to sustain their competitive advantages.
Wan, William P.; Yiu, Daphne W., 2009	Organizational slack would improve firm performance during an environmental jolt because slack is especially salient when the external environment is less munificent	SDC Platinum and Lexis-Nexis; period of 1994-2002	Unabsorbed slack	Behavirol theory and Agency theory	organizational slack would improve firm performance and accentuate the positive relationship between corporate acquisitions and firm performance during an environmental jolt; however, it would have negative impact on firm performance and make the acquisition-performance relationship more negative before and after a jolt.

Ju, Min; Zhao, Hongxin, 2009	Slack represents potentially utilizable resources that can be redeployed to build capabilities and coalitions, and it acts as a buffer between the organization and internal change or external contingencies	State Statistical Bureau of China; period of 1998-2002	Absorbed and unabsorbed slack	institutional theory and industrial organization theory	The current theoretical and empirical results are mixed and suggest positive, negative, and curvilinear relationships between organizational slack and firm performance
Salge, Torsten O., 2011	Organizations differ fundamentally in their ability to adapt and reconfigure their resources, capabilities, and operating routines	NHS; period of 2002-2007	Operational slack and financial slack	Behavirol theory; Process Theory	In particular, it suggests that public service organizations with high levels of available slack are most likely to engage in problemistic search following perceived performance shortfalls
Huang, Yi-Fen; Chen, Chung-Jen, 2010	Organizational slack is often defined as the cushion of actual or potential resources that allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in technologies or markets	Taiwan Stock Exchange; period of 1995-2004	Absorbed and unabsorbed slack	Economy of scope and knowledge-base view	There is an inverse U-shaped relationship between technological diversity and innovation performance. Moreover, the moderating role of organizational slack is recognized and absorbed slack positively moderates while unabsorbed slack negatively moderates the effect of technological diversity on innovation performance.
Chen, Chung-Jen; Huang, Yi-Fen, 2010	Organizational slack is the cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy	Taiwan Economic Journal; U.S. Patent and Trademark Office	Absorbed and unabsorbed slack	N/A	This study suggests that different slacks vary in affecting innovation. When adding absorbed and unabsorbed slacks as moderators, the relationship between creative workforce density and innovation performance becomes strengthened or attenuated respectively
Markoczy, Livia; Sun, Sunny Li; Peng, Mike W.; Shi, Weilei (Stone); Ren, Bing, 2013	Slack may help CEOs pursue firm growth and may have a positive effect on compensation	Shanghai and Shenzhen Stock Exchanges; period of 2001-2006	Potential Slack	N/A	We argue that firms operating within central corporate network positions opt to pay higher CEO compensation without engaging in symbolic management. On the other hand, firms operating in structural hole positions tend to either pay lower CEO compensation or use CCs as a symbolic management tool in order to pay higher CEO compensation
De Carolis, Donna Marie; Yang, Yi; Deeds, David L.; Nelling, Edward, 2009	Slack is potentially utilizable resources that can be diverted or redeployed for the achievement of organizational goals.	Recombinant Capital Database; period of 1992-2003	Available slack, Recoverable slack and Potential Slack	resource-based view; agency theory	Our findings point to the importance of building capabilities to enable a venture to navigate difficult times.
Stan, Ciprian V.; Peng, Mike W.; Bruton, Garry D.	Slack is defined as actual or potential resources that enable firms to adapt to internal and external pressures, and allows the pursuit of goals that are outside the organization's main strategy	N/A	N/A	Behavirol theory and Agency theory	Having slack available helps SOEs deal with unpredictable changes in the highly dynamic markets where they operate.
Goldstein, Susan Meyer; Iossifova, Albena R.	Slack is an effective resource for buffering against marketplace reactions to supply chain disruptions	U.S. Department of Health and Human Services website	Unabsorbed Slack	Behavirol theory	Analysis reveals differing effects that are dependent on hospital slack conditions.
Kistruck, Geoffrey M.; Qureshi, Israr; Beamish, Paul W., 2013	Often use accumulated earnings and organizational slack in the pursuit of new diversification opportunities, charitable organizations, with their absence of excess profits and full-budget approach to acquired resources, are typically forced to seek out new financial resources for the purpose of diversification	Charities Assessing and Registration (CARE) database system; period of 1997-2001	Available Slack	Behavirol theory; resource dependency theory	Findings suggest that while the main relationship between geographic diversification and efficiency is U shaped in nature, the main relationship between product diversification and efficiency is inverted U shaped.
Mousa, Fariss-Terry; Marlin, Dan; Ritchie, William J., 2013	Slack resources are excess resources that are accessible to an organization during a given planning cycle	EDGAR; period of 2001-2005	39 Financial slack, Innovational slack, and Managerial slack	resource-based view	The findings indicate the existence of distinct configurations of slack resources and associated performance differences among the configurations.

Ruiz-Moreno, Antonia; Garcia-Morales, Victor J.; Llorens-Montes, Francisco Javier, 2008	Slack represents the degree to which uncommitted resources are available for the organization	Duns and Bradstreet 2000 database	N/A	Behavirol theory	The results of the investigation reveal first, that the relation between the dimensions of organizational climate, perceptions of support for innovation and performance is moderated by organizational slack.
Chen, Yi-Min; Yang, De-Hsin; Lin, Feng-Jyh, 2013	Organizational slack resources are the firm-specific resources that can provide the flexibility to create and generate new resources or strengthen and extend existing resources for the achievement of organizational goals	Taiwan Economic Journal database; period of 2004-2011	Absorbed and unabsorbed slack	Behavirol theory	The results of hypothesis testing confirm the existence of a significant and negative relationship between technological diversification and firm performance in terms of Tobin's q and MVA, but not of ROA and EVA

Table 2-1- Most cited studies about slack-performance relationship

In similar way, the most commonly accepted classification for slack is Bourgeois III's (1981: 30), interpreted from Cyert and March (1963), which describes it as:

*“Organizational slack is that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well as to initiate changes in strategy with respect to the external environment”* (Bourgeois, 1981: 30).

This definition presented by Bourgeois (1981), being the most widely accepted and cited among the scholars who write on this subject (Smith et al., 1991, Tan and Peng, 2003, Andrews et al., 2008, George, 2005). However, various definitions also exist in the management literature about organizational slack, such as being *“the pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output”* (Nohria and Gulati, 1996: 1246) or *‘the difference between total resources and total necessary payment’* (Cyert and March, 1963: 2)

Past studies have concentrated upon the effect of slack in two distinct ways: (i) as a resource that enables future survival, investment and strategic risk-taking that potentially have high payoffs (Lin, 2014) by stocking necessary excess resources to create strategic options or to take up strategic initiatives, or (ii) as a damaging resource form inhibiting firm growth, operating risk-taking and inefficiency, by leading to mishandling of necessary resources to preserve the status quo or self-servicing behaviors (Dutta et al., 2016, Jensen, 1986, Chrisman and Patel, 2012, Singh and Davidson, 2003).

From the management and organizational theory points of view, slack was seen as a way to hedge against environmental uncertainty<sup>45</sup>, and essential element during the implementation of adaptation strategies (George, 2005). The positive arguments also suggest that organizational slack creates resources available for alternative purposes, in general.

Organizational slack enables investments, more in aggressive innovations, or to protect firms from a potential resource shortage, if facing environmental uncertainty (Latham and Braun, 2009a, Latham and Braun, 2009b, Stan et al., 2014, O'Brien, 2003). Companies struggles to adapt to such new environmental demands (Levinthal and Marino, 2015), to take risky projects (Bromiley, 1991, Singh, 1986), or to reconfigure their strategic behaviors (Bahrami and Evans, 2010, Evans, 1991, Bourgeois, 1981). However, low level of slack may influence decision-makers positively, thereby setting about rapid and highly risky investments (Aras and Kutlu Furtuna, 2015, Lungeanu et al., 2015, Xu et al., 2015).

Some studies proposed that managers may not perceive slack resources as a bad strategy during the adaptation process, but they are rather seen as a risk-related activity (Cheng and Lin, 2012, Lin, 2014, Mundy et al., 2011). In addition, some studies also considered the presence of slack as an essential resource that should never be reduced, and consequently should not alone be eliminated for the sake of a firm's competitiveness and sustainability (Moses, 1992, Surroca et al., 2010).

On the other hand, the agency and economics theory perspectives suggests that accumulating slack is not a good strategy for firms and does not provide economic benefits and further prevents innovation and experimental activities (Shaikh and Peters, 2014, Zona, 2012, Geiger and Makri, 2006, Latham and Braun, 2009b, Lee, 2015).

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<sup>45</sup> Some relevant references are (Stan et al., 2014, Paeleman and Vanacker, 2015, Vanacker et al., 2016, Wang et al., 2016b)



Slack literally refers to the negative and leads to a decrease in discretionary investments in R&D activities and thus it should be reduced in firm activities (Wang et al., 2016b, Lee and Wu, 2015, Gentry and Shen, 2013). The slack literature has evolved overtime and the later studies have broadened the definition (George 2005), which includes various resource characteristics although it was measured by using financial terms and ratios (Arslan et al., 2014, Delen et al., 2013, Latham and Braun, 2009a, Modi and Mishra, 2011, Patzelt et al., 2008).

Slack is important so that it is beneficial to create new forms of strategies and options for firms (Murro et al., 2016). Slack resources characterize one of the pivotal point of such strategies and options (Deb et al., 2016). The root of organizational slack has its origins in many managerial theories (e.g. organizational theory, resource constraint theory, resource-based view, prospector theory, threat-rigidity theory, and agency theory). The next sections will discuss organizational slack in complete detail.

#### 2.1.1.1. Previous Literature and organizational slack

Past slack related studies argued importance of slack and its implications in the different disciplines for decades. These implications are discussed in this section from the perspectives of previous and recent studies and the most cited slack-performance related studies.

##### 2.1.1.1.1. The Origin of Slack and Earlier Studies

The origin of organizational slack originated in '*inducement contribution ratio*' that was suggested by Barnard (1940). Bernard (1938) considered organizational slack as a *buffer* to external environmental changes, thereby reducing the need to change the core activities themselves during the periods of highly minimized environmental munificence (Salancik and Pfeffer, 1978).

The term “*slack*” was introduced and the early conceptualization of organizational slack was discussed by March and Simon in 1958 (March and Simon, 1958). Slack, was defined by different scholars for different purposes in different literature streams<sup>46</sup>. Many scholars from the “*Carnegie School of thought*” have contributed significantly to early conceptualization of slack (Haleblian et al., 2006, Gral, 2013). In the 1950s and 1960s, many scholars studied this subject.

Cyert and March (1963)’s “*A behavioral theory of the firm*” were mainly concerned with the organizational behavior of the firm. Cyert and March, (1963:42) defined slack, for example, as “*the difference between total resources and total necessary payments*”. Some scholars also proposed supplemented criteria about organizational slack. Child (1972) also discussed that excess resources have a negative influence on performance. According to Child (1972), slack may also influence organizational structural configuration.

Cohen et al. (1972) considered slack is an essential substitute for firms by providing cushions between parts of the organization. Slack could be utilized in a discretionary manner to seize potential opportunities (Simsek et al., 2007, George, 2005). Past studies<sup>47</sup> have drawn attention to environment and examined how firms regarded coping with environmental demands. Sharfman et al. (1988) investigated implications of risk-taking in terms of firm performance, which is moderated by organizational slack and found positive and negative implications related to slack resources.

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<sup>46</sup> (Azadegan et al., 2013a, Bourgeois and Singh, 1983, Bowman et al., 2005, Chen and Huang, 2010, Dasí et al., 2015, Dolmans et al., 2014, Du et al., 2014, Guha, 2016, Jalilvand and Kim, 2013, Lin et al., 2009a, Modi and Mishra, 2011, Mundy et al., 2011, Shaikh and Peters, 2014, Zona, 2012)

<sup>47</sup> (Ansoff and Sullivan, 1993, Bourgeois III and Eisenhardt, 1988, Bourgeois, 1980, Cheng and Kesner, 1997, Child, 1972, Clark et al., 1994, Dess and Beard, 1984, Knoll and Jarvenpaa, 1994, Meyer, 1982, Smart and Vertinsky, 1984, Tushman and Anderson, 1986, Venkataraman, 1998, Volberda, 1996, Zahra, 1993, March and Olsen, 1979, Nohria and Gulati, 1997, Dimick and Murray, 1978).

Sharfman et al. (1988), for example, considered that resources need to be in an optimal level for short-term efficiency-(*profitability*) and long-term effectiveness- (*profit maximization*). According to Sharfman et al. (1988), organizational slack must be classified as both slack and buffer, which are two distinct mechanisms for an organization. Although organizational slack has been commonly accepted by many scholars, it has not achieved a consensus on what it actually represents (Moses, 1992). Another contribution was made by Bourgeois (1981) to a definition for slack resources. Bourgeois (1981) argued that slack could be seen as a “*mattress*” of resources that permits organizations to adjust themselves properly to changes in internal environment or to those concerning the external environment. Nohria and Gulati (1997) have tried to draw attention to different manner that created by slack, including unused capacity, excessive numbers of employees, and unnecessary capital expenditure. Finally, Tan and Peng (2003) argued how slack influences firm performance. They examined whether a slack-performance relationship is linear or curvilinear. Some early definitions of slack were demonstrated in Table 2.2 as follows:

Authors	Definitions
Cyert and March (1963):	“The disparity between the resources available to the organization and the payments required to maintain the coalition” [p. 36].
Child (1972)	“The margin or surplus [performance exceeding ‘satisficing’ level] which permits an organization’s dominant coalition to adopt structural arrangements which accord with their own preferences [vs. ‘goodness of fit’ dictates of contingency theory], even at some extra administrative cost” [p. 12].
Cohen, March, and Olsen (1972)	“The difference between the resources of the organization and the combination of demands made on it” [p.12].
Dimick and Murray (1978)	“Those resources which an organization has acquired which are not committed to a necessary expenditure. In essence, these are resources which can be used in a discretionary manner” [p. 616].
March and Olsen (1979)	“The difference between existing resources and activated demands” [p. 87]
Pfeffer and Salancik (1978)	“Slack resources [is] apparent in the form of extra profits or resources” [p. 274].
Wilson (1979) [quoted in Singh 1986]	“Every organization can be said to have a set of functions which define that organization . . . It is also possible to consider some quantity or threshold of resources . . . that is necessary to perform these functions . . . slack [is] any organizational resource or asset beyond that threshold” [p. 5].
(Sharfman et al. 1988; Tan & Peng 2003) cited from Bourgeois (1981)	Slack resources is that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy, as well as to initiate changes in practice with respect to the external environment.
Nohria and Gulati (1997)	“the pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output” [p. 604].

Table 2-2 - Some Early Definitions of Slack

#### 2.1.1.1.2. Most Cited and Recent Studies

Some of recent studies are frequently cited concerning organizational slack. During the last 20 years, the main topics regarding slack were gradually increased. In addition, many studies empirically concentrated on the slack resources and its implications on firm performance. *Figure 2.1* illustrates the studies were drawn from ‘web of science’ database, which include the published paper in each year and most cited empirical studies regarding slack-performance relationship.

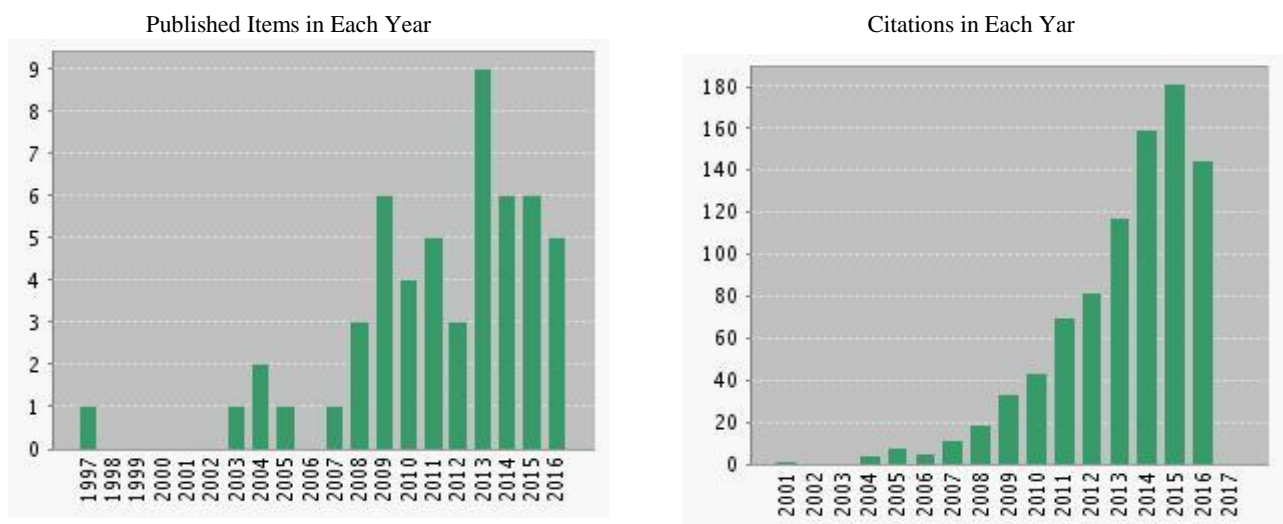


Figure 2-1 - Organizational Slack and Firm Performance Total Citations

This study critically evaluates empirical studies in the slack literature that propose a linkage between slack and performance. Building on this illustrative evidence, the conceptual approach as well as a testing framework, were proposed to indicate the gap in the empirical literature, to date. However, in the research “*Organizational slack and firm performance during economic transitions: Two studies from an emerging economy*”, according to ‘web of science’ database, Tan and Peng is the most cited paper by 213 total citation and %15.21 average per year in around last 20 years. Tan and Peng (2003) have tested whether slack has a curvilinear relationship with firm performance in their study. Furthermore, Pierce and Aguinis (2013) and Daniel et al., (2004) are the second and third most cited articles, which stem from conceptual studies, respectively. The most cited articles are introduced in Table 2.3 as follows:

Title	Authors	Source Title	Publication Year	Total Citations	Average per Year
Organizational slack and firm performance during economic transitions: Two studies from an emerging economy	Tan, J; Peng, MW	STRATEGIC MANAGEMENT JOURNAL	2003	213	15.21
The Too-Much-of-a-Good-Thing Effect in Management	Pierce, Jason R.; Aguinis, Herman	JOURNAL OF MANAGEMENT	2013	93	23.25
Slack resources and firm performance: a meta-analysis	Daniel, F; Lohrke, FT; Fornaciari, CJ; Turner, RA	JOURNAL OF BUSINESS RESEARCH	2004	71	5.46
How do networks and learning drive m&as? an institutional comparison between china and the united states	Lin, Zhiang (John); Peng, Mike W.; Yang, Haibin; Sun, Sunny Li	STRATEGIC MANAGEMENT JOURNAL	2009	70	8.75
Reducing slack: The performance consequences of downsizing by large industrial firms, 1977-93	Love, EG; Nohria, N	STRATEGIC MANAGEMENT JOURNAL	2005	54	4.5
Corporate Governance and Corporate Social Responsibility (CSR): The Moderating Roles of Attainment Discrepancy and Organization Slack	Arora, Punit; Dharwadkar, Ravi	CORPORATE GOVERNANCE-AN INTERNATIONAL REVIEW	2011	41	6.83
CEO duality, organizational slack, and firm performance in China	Peng, Mike W.; Li, Yuan; Xie, En; Su, Zhongfeng	ASIA PACIFIC JOURNAL OF MANAGEMENT	2010	40	5.71
Organizational slack and firm performance during institutional transitions	Su, Zhongfeng; Xie, En; Li, Yuan	ASIA PACIFIC JOURNAL OF MANAGEMENT	2009	39	4.88
From crisis to opportunity: environmental jolt, corporate acquisitions, and firm performance	Wan, William P.; Yiu, Daphne W.	STRATEGIC MANAGEMENT JOURNAL	2009	34	4.25
Behind organizational slack and firm performance in China: The moderating roles of ownership and competitive intensity	Ju, Min; Zhao, Hongxin	ASIA PACIFIC JOURNAL OF MANAGEMENT	2009	27	3.38
A Behavioural Model of Innovative Search: Evidence from Public Hospital Services	Salge, Torsten O.	JOURNAL OF PUBLIC ADMINISTRATION RESEARCH AND THEORY	2011	26	4.33
The impact of technological diversity and organizational slack on innovation	Huang, Yi-Fen; Chen, Chung-Jen	TECHNOVATION	2010	25	3.57
Creative workforce density, organizational slack, and innovation performance	Chen, Chung-Jen; Huang, Yi-Fen	JOURNAL OF BUSINESS RESEARCH	2010	18	2.57
Social network contingency, symbolic management, and boundary stretching	Markoczy, Livia; Sun, Sunny Li; Peng, Mike W.; Shi, Weilei (Stone); Ren, Bing	STRATEGIC MANAGEMENT JOURNAL	2013	15	3.75
Weathering the storm: the benefit of resources to high-technology ventures navigating adverse events	De Carolis, Donna Marie; Yang, Yi; Deeds, David L.; Nelling, Edward	STRATEGIC ENTREPRENEURSHIP JOURNAL	2009	14	1.75
Slack and the performance of state-owned enterprises	Stan, Ciprian V.; Peng, Mike W.; Bruton, Garry D.	ASIA PACIFIC JOURNAL OF MANAGEMENT	2014	13	4.33
Ten years after: Interference of hospital slack in process performance	Goldstein, Susan Meyer; Iossifova, Albena R.	JOURNAL OF OPERATIONS MANAGEMENT	2012	9	1.8
Geographic and Product Diversification in Charitable Organizations	Kistruck, Geoffrey M.; Qureshi, Israr; Beamish, Paul W.	JOURNAL OF MANAGEMENT	2013	8	2
Configurations of slack and their performance implications: an examination of high-tech IPOs	Mousa, Fariss-Terry; Marlin, Dan; Ritchie, William J.	MANAGEMENT DECISION	2013	7	1.75
The moderating effect of organizational slack on the relation between perceptions of support for innovation and organizational climate	Ruiz-Moreno, Antonia; Garcia-Morales, Victor J.; Llorens-Montes, Francisco Javier	PERSONNEL REVIEW	2008	7	0.78
Does technological diversification matter to firm performance? The moderating role of organizational slack	Chen, Yi-Min; Yang, De-Hsin; Lin, Feng-Jyh	JOURNAL OF BUSINESS RESEARCH	2013	6	1.5

Note: This table reflects citations to source items indexed within Web of Science Core Collection.

Table 2-3- The most cited articles last 15 years

Past studies<sup>48</sup> suggested that there are various forms of slack (Daniel et al., 2004). Most of current classifications of slack were developed over time by using Bourgeois (1981)' classification as a guideline. Slack can be exhibited in different firm resources<sup>49</sup>, such as human resources, innovation, and other tangible and intangible resources (Meyer, 1982, Bahrami and Evans, 2005, Diaz et al., 2016, Kawai, 2015). On the other hand, management literature mostly prefers to employ accounting-based financial resources as a proxy variable when measuring slack (Daniel et al., 2004). The most common forms, sources and functions of slack are therefore described as follows:

#### *2.1.1.1.3. Agreements and Disagreements on Slack and Existing Gaps in Literature*

As emerging from earlier studies, organizational slack has an uncertain nature, and its critical influence on firm performance is still ambiguous in the context of environmental uncertainty (Zheng and Yu, 2017). The main agreement on concept of organizational slack is that existing slack categories for organizational slack is not entirely consistent (Gadepalli and Ray, 2017), and many of these categorizations are overlapping (Song and Choi, 2017, Stan et al., 2014). The extant literature on organizational slack shows that slack can be group under the different overlapping categories (Daniel et al., 2004, Cerrato and Alessandri, 2017).

This indicates that different forms of slack can create different resource endowments but in a similar way in the organization (Sui and Baum, 2014). It can be also said that overlapping of slack forms indicates coexistence of similar resources. Therefore, it becomes critical for organizations to distinguish right resources accurately in order to determine the best firm strategies (Yu et al., 2016).

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<sup>48</sup> Some relevant references (Gral, 2013, Guha, 2016, Lee and Wu, 2015, Lin et al., 2009a, Liu and Fu, 2016, Marlin, 2014)

<sup>49</sup> Slack has many different classifications that are important to operationalization of slack.

In addition, past studies showed that organizational slack resources have assorted benefits for firms but also critical consequences, which partially rely on the forms of slack (Parker et al., 2017). However, the general consensus on organizational slack is that the availability and convertibility of slack is main criteria in categorization of slack (Mousa et al., 2017, Kuusela et al., 2016). The employability of slack resources depends on availability of slack. The availability of slack is crucial for organizations since it creates strategies for future prosperity and firm survival (O'Brien and David, 2014).

Similarly, convertibility of slack eases capital restrictions (Hong and Shin, 2016, Zambuto and Nigro, 2014). In addition, convertibility of slack provides firms to have more flexible manoeuvrability (Gadepalli and Ray, 2017), allowing firms to exploit spontaneous opportunities with varying positive performance implications. Therefore, availability and convertibility of slack are two essential factors for firms (Marlin and Geiger, 2015b).

Another main consensus in slack literature is that the development of slack relies on combinations of environmental factors (Zheng and Yu, 2017) and organizational characteristics (Zona, 2012). The slack provides more manoeuvrability for internal and external adaptation processes (Álvarez et al., 2007, Chakrabarti, 2015). Therefore, slack enables a resource buffer for firms in order to deal with uncontrollable external environment (Malen and Vaaler, 2017).

The availability of transforming slack from one form to another one creates a need for appropriate slack management alternatives (Josefy et al., 2015, Marlin and Geiger, 2015b, Sanchez, 1995). However, very little is known about the organizational characteristics and slack relationship.

Although existing of some evidence that show allocation of slack resources depend upon environmental conditions (Hong and Shin, 2016), the organizational characteristics that dependent to forms and levels of slack resources has not been properly investigated. The one of the main aim of thesis is to examine both environmental and organizational factors associated with slack-performance relationship.

On the other hand, although previous studies have made great progress regarding slack-performance relationship, slack literature suffers from three main disagreements. First, it has not shed light on, except very rare studies, the performance differences in form and level of firm resources and but not from the perspective of before, during and after financial crisis. Generally, managers can interpret their excess resources positively and negatively depends on their forms and levels of resources (Vanacker et al., 2016). From a theoretical point of view, scholars like Hong and Shin (2016) and Lungeanu et al. (2015) suggest that slack is crucial variable between organizational context and environment. The different forms of slack with varying levels can influence managers' perceptions (Marlin and Geiger, 2015b).

From an empirical point of view, many studies have investigated how organizations may encourage perceptions of slack by means of different slack resources (Bradley et al., 2011b). However, there is no consensus about how and to what extent slack resources affect firm performance. Second, as mentioned before, slack literature mostly classified organizational slack into different categories based on availability and convertibility of firm resources (Stan et al., 2014). However, there is no agreement on how and to what extent these availability and convertibility of slack resources help firm performance in response to environmental changes.



Additionally, there is also no consensus regarding whether scarcity or abundance of organizational slack that is most advantageous for firm performance in the management literature and this is still heavily debated topic (Paeleman and Vanacker, 2015, Kuusela et al., 2016). There is no agreement between management studies regarding where, when and how organizational slack impacts firm performance, especially for different environmental contexts. Particularly, from the perspectives of adaptation and adaptation-based ambidexterity and risk-taking behaviours, slack -performance relationship can provide more comprehensive picture for managers when facing environmental changes.

Third, past studies examined organizational slack in different context such as slack-innovation (Marlin and Geiger, 2015b) and slack-performance (Vanacker et al., 2016). In particular, recent studies mostly argued for different types of slack-performance relationships such as linear, U-shaped and inverted U-shaped curvilinear relationships (Vanacker et al., 2016, Paeleman and Vanacker, 2015). However, past studies have never investigated these relationship in context of management of slack. Analysis of slack management can contribute a better understanding for slack-performance relationship and hence enable the adaptation through environmental change.

When considered from this point of view, it is not easy to explain the mechanism of slack management process by means of which firms needs to use in case of unexpected situations. This is where the introduction of several theories, particularly slack management, can make an important progress. The forms and amount of excess resources will assist to bring about the potential improvement of firm performance (Vanacker et al., 2013). It is argued in this study that organizational slack may overcome the challenges of environmental uncertainties and related complications.

### *2.1.1.2. Forms of Slack*

It is clear from the earlier arguments that the existing classification of slack in literature is contradictory and overlapping (Cheng and Lin, 2012, Dutta et al., 2016, Wang et al., 2016a, Daniel et al., 2004, Mizutani and Nakamura, 2014). Therefore, it is important to distinguish slack resources properly based on its antecedents, forms and functions in order to offer a clear and achievable foundation.

It is possible to categorize slack resources depending on different criteria (Esposito and Renzi, 2015). To explain organizational resources from the broader perspective, nine different forms of slack, which included different forms of slack in each group, are presented in the following section. The most commonly operationalized slack<sup>50</sup> classification and most-fine-grained approach in the management literature originates from the studies of (Marlin, 2014, Marlin and Geiger, 2015b).

To be able to the apprehend underlying logic of slack in the organization, it is important to clarify certain factors, such as forms, functions, processes, and in what circumstances the excess resources are used in the different environmental conditions (Bourgeois III and Eisenhardt, 1988, Bourgeois, 1980, Bradley et al., 2011b, Chen, 2015b).

According to Borgeouis (1981), slack management (or process) consists of an antecedent of slack, organizational slack itself, and the role of slack (Murro et al., 2016). The management of slack itself consists of forms, functions, and measures. At least nine slack categorizations are repeated throughout management literature (see figure 2.2):

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<sup>50</sup> These various measurement of slack used to operationalize slack are investigated under the different forms and types of slack.

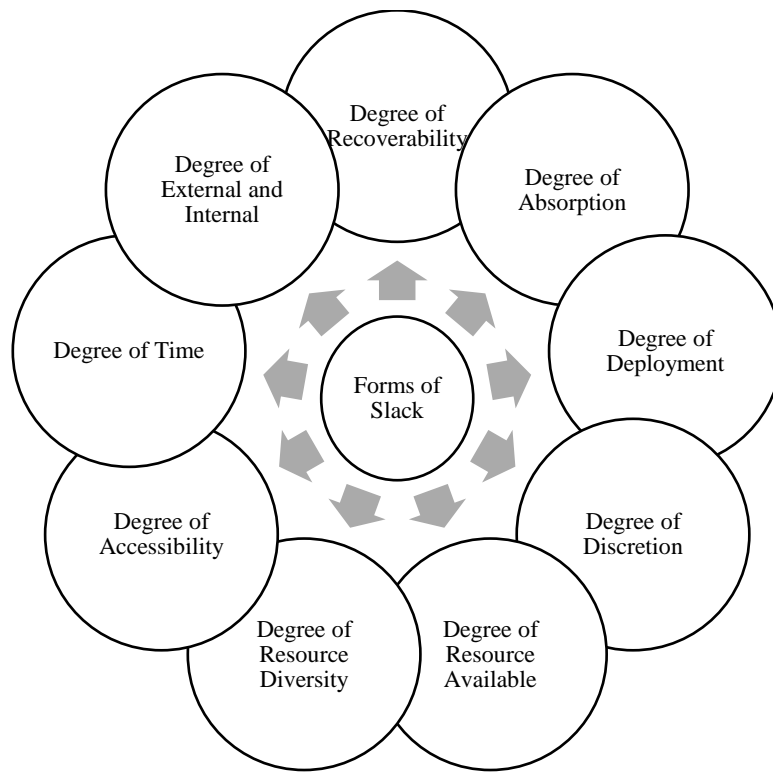


Figure 2-2 - Forms of Slack

Bourgeois (1981) and later Bourgeois and Singh (1983) distinguish between financial and non-financial resources as *unabsorbed* (available), *absorbed* (or recoverable), and *potential* slack. This classification shows ‘*degree of recoverability*’ for firm resources. (2) Singh (1986) later differentiates these resources as unabsorbed and absorbed slack. Unabsorbed and absorbed slack refers to ‘*degree of resource absorption*’. (3) Chakravarty (1986) and later Greenly and Oktemgil (1998) applies *invested* and *generated* slack. This classification denotes ‘*degree of resource deployment*’ based on managerial perceptions.

(4) Sharfman et al. (1988) differentiated these financial and non-financial resources as ‘*high and low discretion slack*’, and with a similar reasoning. (5) George (2005) introduced the term of “*transient slack*”, which indicates the difference between ‘*resource available*’ and ‘*resource demand*’.

Different transient resources lead to different outcomes for organizational needs (George, 2005). (6) Voss et al. (2008) categorize slack resources as *financial, operational, human resource, and customer slack*. (7) Dolmans et al. (2014) identified three kinds of constraints and restraint echoed the three forms of excess resources: *capacity, capability* and financial slack. (8) Finally, Finkelstein and Hambrick (1990) differentiate slack resources as *immediate slack* and *deferred slack*.

#### 1.1. ‘Degree of recoverability’: *Available, recoverable, and potential*

Bourgeois (1981) identified three distinct forms of slack: available slack, recoverable slack and potential slack (Marlin and Geiger, 2015b, Marlin and Geiger, 2015a, Miller and Lessard, 2001, Greenley and Oktemgil, 1998). This form of slack is also known as “*easy-of recovery*” taxonomy according to pattern of recoverability (Mishina et al., 2004, Esposito and Renzi, 2015). Slack resources can be categorized by different degrees of recoverability (George 2005) based on their ontological dimensions (Esposito and Renzi, 2015).

*Available slack* is identified in prior studies as the level of resources that are unexploited, but readily available (Marlin, 2015; Millar, 2001; Sender, 2004). Thomson and Millar (2001):66 defined available slack “*is related to the net slack of net resources and can be quickly allocated to improve productivity and contribute to the fulfilment of a certain goal*”. That kind of slack has not yet been absorbed but embedded in organizational activities, and considered as a kind of a liquidity (or *fungibility*) surplus (Demirkan and Gumusluoglu, 2016, Guha, 2016, Wiengarten et al., 2016).

*Recoverable slack* mostly refers to organizational expenses that are absorbed resources, which are more than needed by the firm and embedded resources in strategic operations which could be recovered during a financial crisis (Vanacker et al., 2016, Guha, 2016, Rudy and Johnson, 2016).

The only dissimilarity between absorbed and recoverable slack is '*feature of recoverability*' (Orlando et al., 2016, Esposito and Renzi, 2015). These resources can be recovered through improved competence. For example, reducing some essential expenses such as reduction of general expenses. That kind of slack resource can be recovered in short and long term periods (Lee and Wu, 2015, Lee, 2015).

*Potential slack* represents the potential resources that obtain from external debt financing (Kuusela et al., 2016, Dong, 2016). It also shows firms' ability to produce further unexpected resources from the external environment before competitors increase additional loans, firm capital or investments (Deb et al., 2016, Shahzad et al., 2016). In a sense, potential slack encompasses "*profitability*" (Greenley and Oktemgil, 1998) "*the ability to raise loans for future investments, to take risk and raise additional loans, raise additional equity, and dividend payments*"; "*the ability to generate resources*" and "*the unused borrowing capacity of the company*" (Murro et al., 2016, Rust and Katz, 2002, Cheng and Kesner, 1997): Murro et al, 2016: 138)

#### 1.2. 'Degree of absorption': Absorbed Slack and Unabsorbed Slack

Slack resources can influence the degree of negative impact of managers when they face changes in the environment, and therefore, affect firm adaptability (Hong and Shin, 2016). According to Singh (1986), there is a dichotomy in slack resources, that is, '*operational redundancy*' and '*financial redundancy*' (Wang et al., 2016a) that has potential to lead to such negative effect. Jitendra V Singh (1986) therefore classified slack as absorbed and unabsorbed slack. Several scholars also employed the same categorization in their studies (Wiengarten et al., 2016, Paeleman and Vanacker, 2015, Vanacker et al., 2016).

*Absorbed slack* refers to specific procedures, tasks and resources embedded in the organization. It shows therefore *operational redundancy* (Wang et al., 2016a). Absorbed slack represents irreversible commitments to be reconfigured intra-organizationally, and ontologically restricted in reuse (Kim and Bettis, 2013). It corresponds to investment in specific resources for the sake of adaptability.

It also represents low risk and aims to reprocess resources and capabilities to improve organizational convention (Kolev, 2016, Kobus et al., 2016). However, a greater level of absorbed slack tends to reduce unrestrained losses by cancelling exploration activities, yet increasing exploitation activities when their managers perceive environmental changes (Voss et al, 2008). In addition, these committed resources could have a significant impact on future firm profitability (Deb et al., 2016, Wiengarten et al., 2016).

*Unabsorbed slack*, however, refers to uncommitted excess resources in organizations (Lichtenthaler, 2016, Argilés et al., 2016). It reflects therefore *financial redundancy* in the organization. It is most convertible resources and therefore easily reconfigured to realize firms' objectives (Wang et al., 2016a). Firms must employ *incremental revaluation* when environmental threat emerges.

Due to the nature of sudden environmental changes and situation of "*need-to-response*", firms might not use *disruptive revolution* that requires necessary liquid resources (Dutton and Duncan, 1987). Therefore, firms need to accumulate necessary excess uncommitted resources to deal with such environmental threats. Unabsorbed slack resources help firms to take risky initiatives (Thomson and Millar, 2001) and conduct exploration activities (Voss et al, 2008).

### 1.3. Degree of deployment

Chakravarthy (1986) classified organizational slack as ‘invested slack’ and ‘generated slack’ (Wang et al., 2016b, Lungeanu et al., 2015, Mousa and Reed, 2013, Torben, 2009). Both invested and generated slack, are important determinants of firm performance, indicating the critical level of slack needed for flexibility (Byoun, 2016, Ashwin et al., 2016).

*Invested Slack* generally represents deployed resources and resource commitment in the organization for specific development purposes (Gral, 2013, Mousa and Chowdhury, 2014, Mousa and Reed, 2013, Anderson and Eshima, 2013). It could have a significant impact on the opportunity to create strategic options (via adaptability process) for future flexibility (Torben, 2009, Greenley and Oktemgil, 1998). For example, resource investment in exploration activities such as R&D expenditure shows adaptation process development commitments and creates a form of invested slack (Ashwin et al., 2016, Shaikh and Peters, 2014, Tyler and Caner, 2015, Wu and Tu, 2007).

Accordingly, investment in R&D should enable the sufficient adaptation and risk-taking with superior performance outcomes (Ashwin et al., 2016, Lee and Wu, 2015). On the other hand, some scholar suggested that excessive slack can cause instability and economic inefficacies in the organization (Nohria and Gulati, 1996, Shaikh and Peters, 2014, Zona, 2012).

*Generated Slack* usually specifies unexploited firm resources to pursue strategic options (Torben, 2009). Generated slack indicates slack resources are available for investment (Juul Andersen, 2009). However, the level of generated slack in capital provides higher flexibility to firms to execute the organizational objectives ((O'Brien, 2003, Torben, 2009). The generated slack can be implemented to a number of strategic options to increase shareholder wealth (Mousa and Reed, 2013, Mousa et al., 2013, Shahzad et al., 2016, Gral, 2013).

#### 1.4. Degree of discretion

Sharfman et al. (1988: 602) distinguished ‘discretionary slack’ as high-discretion slack and low-discretion slack, which provides firms with implicit benchmarks for resources comparison with their competitors for the sake of motivating strategic actions and competitive behaviours (Wang and Ke, 2016). Organizational theory proposes that *discretionary slack* has a positive impact on performance through enabling organizations to explore new strategies and opportunities .

High discretion slack was defined as “*the degree of internally generated excess liquidity a firm has after external demands on the firm’s financial resources are met*” (Banalieva, 2014):110). High discretion slack allows firms great convenience to repay their debt and liability claims quickly (Stan et al., 2014, Zambuto and Nigro, 2014, Cheng and Lin, 2012). High discretion slack resources also facilitates effectively replacing firms’ risk-avoid strategy with risk-taking strategy (Banalieva, 2014, Mahto and Khanin, 2015).

Low discretion slack was, however, defined as resources that are difficult to redeploy and less flexible for deployment (George, 2005). Great level of low discretionary slack may cause decreases in risk-taking initiatives, exploration activities and less encouraged innovation (Cheng and Lin, 2012, Stan et al., 2014).

#### 1.5. Degree of resource availability

*Transient slack* was introduced by George (2005), and defined as, the difference between *resource available* and *resource demand* (Stan et al., 2014, Argilés et al., 2016, Gral, 2013). It refers to difference between excessive resources available and resource demands for operations (George, 2005). The concept of transient slack denotes temporary nature of slack (Lee and Wu, 2015). The main difference between high-low discretion slack and resource available-demand occur due to the difference between ‘*absolute level*’ and ‘*relative level*’ of slack (George, 2005).



## 1.6.Degree of resource diversity

Voss et al. (2008) suggested two main components of RBV in order to measure the degree of resource diversity: (1) resource rarity and (2) resource absorption (Kim and Kim, 2016). They also mapped four forms of slack based on these two components: *financial*, *operational*, *human resources* and *customer relationship* (Voss et al., 2008)

*Financial slack* indicates the level of slack liquidity within the entities such as cash and cash equivalent (Wiengarten et al., 2016, Lee, 2015). Financial slack is the slack that is easiest to redeploy and least committed resources in the organization (Shahzad et al., 2016, Kuusela et al., 2016). This slack is the perfectly divisible form of resources for allocation to multiple purposes (Wang et al., 2016b, Xu et al., 2015). If faces financial slack constraints, this create pressure on firms for negatively incremental repositioning in the market (Kuusela et al., 2016, Vanacker et al., 2016, Stan et al., 2014). It offers an easily reallocate-able protection during uncertain times.

*Operational slack*, however, implies available operational resources (Iliev and Welch, 2013). Operating slack is a committed slack resource, which is relatively difficulty to redeploy for alternative use in the near term (Stan et al., 2014, Xu et al., 2015). Due to the absorbed nature of slack, it is anticipated that there is detrimental association between exploration activities and operating slack resources, but positive relationship with exploitation activities (Liu et al., 2014).

*Human Resource Slack* means skilled human resources that are committed and very rare (Lecuona and Reitzig, 2014, Du et al., 2016). Human resource slack has also a potential to creating long-term competitive advantage (Shahzad et al., 2016, Vanacker et al., 2016). This form of slack is assimilated, absorbed and committed because it is intimately linked with current routine operations.

*Customer relation slack* reflects ‘*relational resources*’ in the organization (Voss et al., 2008). It refers to excess resources absorption stemming from ‘specific relational stakeholders’, and ‘board members’ (Sui and Baum, 2014). However, apart from human resource slack, it is relatively rare and used, uncommitted and unabsorbed firm resources. Customer relationship slack are less encouraged to allocate and use ‘because of its rarity’ (Voss et al., 2008).

#### 1.7. Degree of resource accessibility

The definition of slack has been refined by classification about its accessibility. Finkelstein and Hambrick (1990) distinguish slack resources as *immediate* and *deferred* slack. In addition, immediate slack refers to short-term slack resources that can be accessed to meet needs and opportunities such as working capital resources (Raastad, 2014).

*Immediate slack* can be categorized as a candidate for the unabsorbed slack or high-discretion slack (Geiger and Gashen, 2002). However, *deferred slack* can be considered as a potential slack component. Daniel (2004) suggested that both immediate and deferred slack has a more significant relationship with performance when compared to recoverable slack.

#### 1.8. Degree of Time

Time-period for re-deployability is also an essential characterization of slack. Recognizing that resource position and performance analyses characterise annual cycles, *short-term slack* refers to slack that can be committed within one year . Otherwise, it refers to *long-term slack* (Nohria and Gulati, 1996, Nohria and Gulati, 1995, Nohria and Gulati, 1997). Thus, unexploited (available or flexible) excess resources may be seen as ‘short-term slack’, while absorbed or non-recoverable (committed) excess resources may be referred as ‘long-term slack’ (Sharfman et al., 1988).

### 1.9. Degree of external and internal environment

According to Marlin (2014), slack consists of two main components: *internal slack* and *external slack*. *Internal slack* consists of already absorbed or readily available resources that are within the firm (Geiger and Gashen, 2002, Bowen, 2002). It refers to resources that are either unabsorbed or already committed and considered recoverable within the firm (Marlin, 2014).

*External slack* indicates resources that can obtain external sources and therefore it is not available presently within the company. For example, debt financing can be represented as external slack. *External slack* is potential or unabsorbed resources as a part of firms' resources and assets (Marlin, 2014). However, the available part of resources are external slack, that can be recovered and redeployed, through a typical process (Tan and Peng, 2003, Mizutani and Nakamura, 2014).

This form of excess resources are often produced as a result of the exploration activities. *External slack* enables firms to potentially search new opportunities and provides necessary funds for exploration and exploitation quickly (Geiger and Cashen, 2002; Marlin, 2014). The overall forms of slack resources were mapped in figure 2.3. According to this map, most committed and least flexibility slack form was pointed as *human resource slack*. However, least commitment and most flexible slack form was illustrated as *financial slack*. The relationship between slack and related concepts (e.g., resource flexibility and resource commitment) will be discussed in chapter 3 in detail.

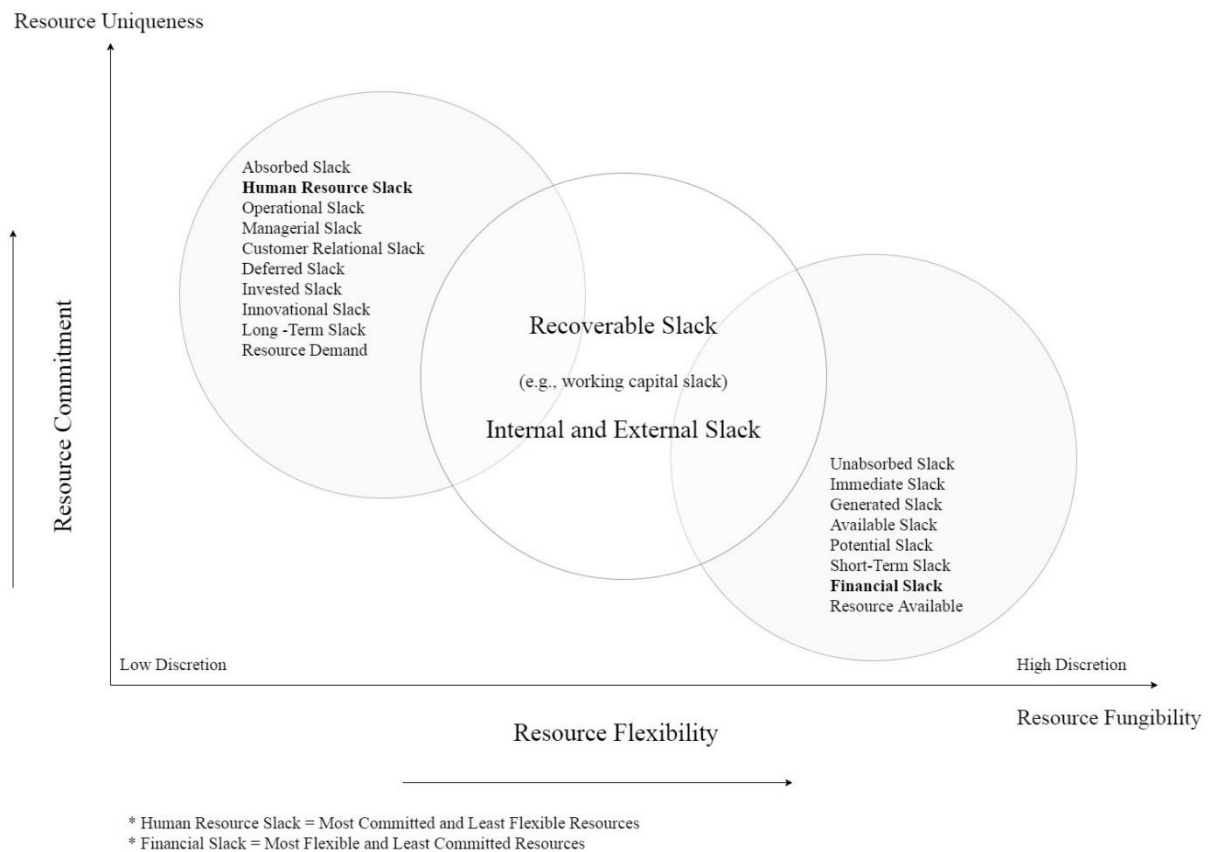


Figure 2-3 - Forms of Slack Map

#### 2.1.1.3. Functions of Slack

Organizational slack literature<sup>51</sup> shows that there are multiple roles and purposes for slack in organizations. If assuming that slack is source of flexibility, slack reflects resource manoeuvrability, both for risk-taking and investing activities (Martinez and Artz, 2006). Hence, it allows internal and external adaptation processes (Greenley and Oktemgil, 1998). Flexible resources possessed by firms have been indicated to permit high level of firm performance with respect to manoeuvrability (Evans, 1991). Various functions of slack within organization have evolved which foster manoeuvrability (Gral, 2013).

<sup>51</sup> Some relevant references are (Arora and Dharwadkar, 2011, Chen et al., 2015, Chen et al., 2013, Dutta et al., 2016, Esposito and Renzi, 2015, Fadol et al., 2015, Jifri et al., 2016, Ju and Zhao, 2009, Lichtenthaler, 2016, Lin, 2014, Lungeanu et al., 2015, Rust and Katz, 2002, Simsek et al., 2007)

Within the organization, there are divergent functions that suggest differences in firm performance<sup>52</sup> (Daniel et al., 2004). Resource-rich firms show considerable variation in slack management that could affect manoeuvrability (Meyer, 1982, Oktemgil and Greenley, 1997, Tsai and Luan, 2016, Volberda, 1996, Zajac et al., 2000). The morphological characteristics of organizations represent a balance between stability for environment and instability for manoeuvrability.

Major slack functions affecting manoeuvrability stem from positions of resources and flexibility of the organization (Bahrami and Evans, 2010, Bordoloi et al., 1999, Ford et al., 2002, Lee et al., 2009, Meier et al., 2013, Pauwels and Matthyssens, 2004, Ruiz, 2006, Sanchez, 1995). Within the uncertainty, variation in resources and functions affects firm performance (Voss et al., 2008, Fadol et al., 2015, Koberg, 1987).

Positions of the higher level of resources provide a generally stable organizational environment<sup>53</sup> (Brauer and Wiersema, 2012, Dolmans et al., 2014, Gong and Shi, 2007, Greve, 2011, Lee et al., 2009, Nickerson et al., 2001, Singal and Jain, 2016). Bourgeois (1981) suggested a small number of slack functions, which are mostly based on their manoeuvrability.

Firstly, Bourgeois (1981) pointed out that slack indicates an ‘inducement to remain within the system’, ‘conflict resolution’ and a resource for manoeuvrability. Secondly, slack represents the function of a ‘technical cushioning instrument in the workflow processes’ (Bourgeois, 1981). Thirdly, Bourgeois and Singh (1983:31) suggested that slack is a ‘*facilitator of certain types of strategic and creative attitudes*’. The main functions slack were shown in figure 2.4 as follows:

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<sup>52</sup> Firm performance is constrained by organizational characteristics with mobility, adaptability and flexibility, and position of the resources determining the level of performance (Bradley et al., 2011b).

<sup>53</sup> Destabilizing environments generated during financial crisis are balanced by firms' exploration and exploitation activities (Hong and Shin, 2016, Makkonen et al., 2014, Meier et al., 2013, Tan and See, 2004).

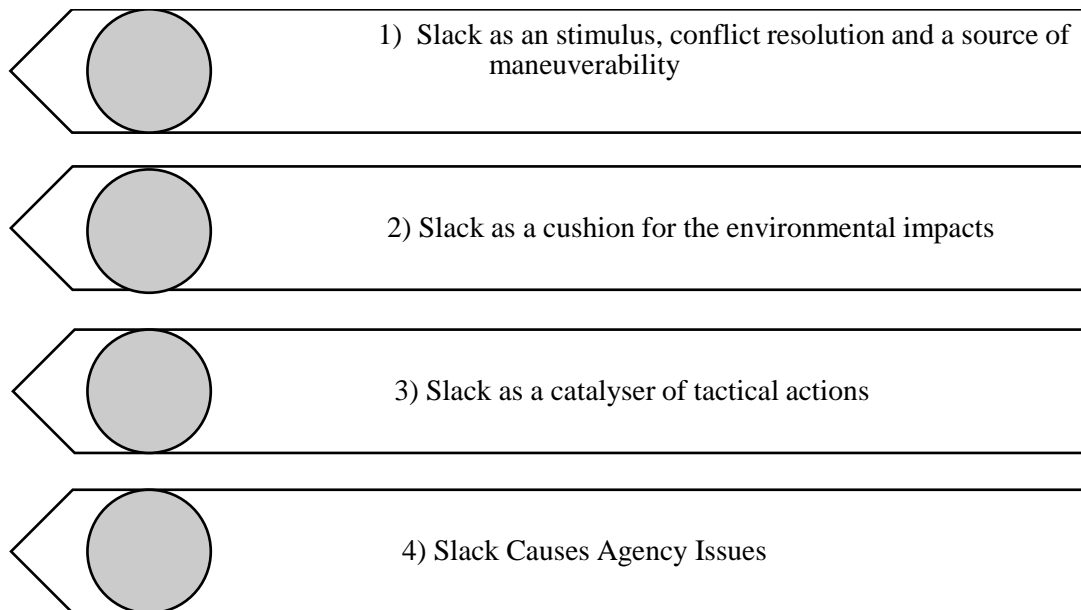


Figure 2-4 - Functions of Slack

Reference: (Gral, 2013:26)

- Slack as an Stimulus, Conflict Resolution and a Source of Maneuverability

The concept of '*slack as a stimulus and conflict resolution*' was first suggested by Barnard (1938) to measure the inducement/contribution ratio. According to Barnard (1938), slack, accumulated either intentionally or unintentionally, plays a critical role as an inducement to coalition members (Wang et, al, 2016) or employees (Barnard, 1938).

March and Simon (1958) later identified slack as the incentives sources through the inducement/ contribution ratio can be more than 1, which is equivalent to more payment to retain employees' services. This slack concept was then employed by Cyert and March (1963) to indicate how important the payments made to the members of the coalition to maintain the organization are.

Pondy (1967) later introduced the concept of ‘slack as a resource for conflict resolution’ (Bourgeois and Singh, 1983, Moch et al., 1977). Sub-unit conflicts can be solved by adopting a decentralized organizational structure through the presence of slack resources (Riahi, 2003). The level of slack therefore characterizes manoeuvrability and two of these functional requirements provide manoeuvrability for firms (Bahrami and Evans, 2010, Evans, 1991).

This manoeuvrability allows firms to allocate, to diversify and to deploy slack through resource flexibility and resource commitment (Dooley and Fryxell, 1999, Kulkarni and Ramamoorthy, 2005, Ruiz, 2006). The choice of flexibility /commitment provides flexibility (manoeuvrability) for firms when needed.

- Slack as a Cushion for the Environmental Impacts

The function of slack as ‘*a technical bulwark from the external setting*’ indicates variances and discontinuities caused by environmental uncertainty and was suggested by of the most significant roles of slack is to be a buffer of resources that cushions firms from environmental shocks (e.g, financial crisis (Bradley et al., 2011a, Bradley et al., 2011b, Busch, 2011, Cai et al., 2016, Chen, 2015b)). Slack enables firms to handle unexpected changes in the environment by buffering their technical core (Stan et al., 2014).

Slack acts by lessening the direct influences of uncertainties on changes in flexibility (Fiegenbaum and Karnani, 1991, Meier et al., 2013, Nadkarni and Narayanan, 2007, Pauwels and Matthyssens, 2004, Ruiz, 2006, Sanchez, 1995, Sanchez, 1997, Shimizu and Hitt, 2004, Thomas, 2013). Slack contributes performance stability through increasing resource flexibility and, ultimately, firm survival in environmental uncertainty (Aaker and Mascarenhas, 1984, Arslan et al., 2014, Bahrami and Evans, 2010, Byoun, 2016, Evans, 1991, Kulkarni and Ramamoorthy, 2005, Lee et al., 2009).

Possessing a high level of resource flexibility on organization enables firms to create strategic options when faced with environmental uncertainty (Chakravorthy and Lorange, 1984, Ford et al., 2002, Klingebiel and Adner, 2015, Sanchez, 1993, Smit, 2001, Wu and Tu, 2007). The buffering mechanism as a function of slack is used to adapt to sudden environmental changes (Donada and Dostaler, 2005).

Slack also empowers firms with organizational adaptation associated with resource flexibility and manoeuvrability (Ghosh and Taylor, 2016). The role of slack as ‘a technical buffer’ provides an essential cushion within organizations against financial crisis, at least some of the time, and to some extent (Marlowe, 2005, Hendricks et al., 1995, Hendrick, 2006). Slack is a cushion of process improvement and facilitates a short-term adaptation process.

- Slack as a Catalyzer of Tactical Actions

Various researches on excess resources argue that the function of slack allows firms to engage in strategic behaviours within an organization (Andrews et al., 2008, Aragon and Sharma, 2003, Chakravorthy, 1986, Cheng and Lin, 2012, Combs et al., 2011, D’Aveni, 1994, Doz and Kosonen, 2008, Bourgeois, 1981).

Firms use slack resources by redeploying them for exploration or exploitation activities (Geiger and Makri, 2006, March, 1991, Voss et al., 2008). The presence of excessive slack resource may encourage managers to be more proactive and aggressive (Ferrier et al., 2002, Teng, 2007). Put differently, slack creates funds that facilitate investments relative to strategic projects (Ashwin et al., 2016, Lee, 2015).

These factors enable the creative behaviours, experimentations and investment for technological innovations (Stan et al., 2014). Slack enables risk-taking for innovation and politics (Ghosh and Taylor, 2016).



Since slack is a facilitator of proactive behaviour, it tends to create manoeuvres that allow the firm to benefit from exploration- oriented activities (A Riahi-Belkaoui, 2003). Bourgeois (1981) suggested that slack plays a critical role in creating enhanced experimentation by permitting the accumulation of a higher level of excess resources (Thomson and Miller, 2001).

Excess resources can be either a catalyzer or preclusive when faced with risk. In this case, the best option for firms is to invest in or eliminate slack whatever the consequences (Wang et al., 2016b). Therefore, a trade-off between risk-seeking and risk-averse strategies depends on the level of resources. High level of slack may facilitate to take risky strategies and thus achieving higher performance (Bruneel et al., 2016, Vanacker et al., 2016).

- Slack Causes Agency Issues

Specifically, organizational conflicts may lead to different preferences for slack allocation (Stan et al., 2014, Marlin and Geiger, 2015b). (Chrisman and Patel, 2012, Dutta et al., 2016, Shaikh and Peters, 2014, Zona, 2012). Considering 'slack causes agency issues', agency scholars advocate that excess resources lead to inefficiency in the organization, prevents risk-taking initiatives, and damages performance (Cheng and Lin, 2012, Ashwin et al., 2016, Wang et al., 2016b, Jensen, 1986, Jensen and Meckling, 1976).

Put differently, slack may demoralize directors from applying hazardous strategic projects while enabling directors to maintain their private benefits (Chen et al., 2015, Chen et al., 2013, Cheng and Kesner, 1997, Cheng and Lin, 2012, Fadol et al., 2015, Geoffrey and Nohria, 2005, George, 2005). In this regard, only a limited number of strategic options will be available to pursue risky investments (Klingebiel and Adner, 2015, Martin et al., 2015, Sanchez, 1993, Trigeorgis, 1996). Jensen (1986) posited that too much slack might induce organizations to be efficient and proactive in allocating and mobilizing resources.

Additionally, surplus resources may cause personnel to become unsatisfied and affluently pessimistic, and to feel less forced to invest in exploration activities (Voss et al., 2008, Yang et al., 2014a, Kim et al., 2008, Lee and Wu, 2015). In other words, excessive slack may lead to rigidity and organizational inertia, thereby reducing incentives for risk-taking and exploration (Jensen, 1986, Nohria and Gulati, 1997).

Hence, it is more likely that impacts of surplus resources on risky investments and risk seeking differ contingent on the degree of slack resources (Latham and Braun, 2009b, Li and Tang, 2010, Martinez and Artz, 2006, Singh, 1986, Van Der Vegt et al., 2015). It was also claimed that slack affects firms positively up to a certain point; that it commences to affect organizational outputs negatively (Fadol et al., 2015, Lee, 2015, Shahzad et al., 2016, Tan, 2003).

In conclusion, slack can be seen as either a source of flexibility or a source of risk, which partially depends on level and forms of slack. Slack can enable firms to overcome conflicts, limit the detriment from political behaviours, buffer from environmental threats and provide exploration and strategic actions (Lee, 2011). However, viewing slack as a source of risk, inefficiency can be stimulated by the existence of slack in the organization (Chiu and Liaw, 2009).

In different environmental conditions, firms may behave differently (Bradley et al., 2011b). Therefore, forms and levels of slack represent key organizational characteristics. The subsequent section details the antecedents of slack, the predictions on its relationship with its functions and internal and external factors that influence slack management and slack-performance. Existing literature employs a different classification of slack and varying definitions to investigate this relationship.

#### *2.1.1.4. Antecedents of Slack*

Past research has suggested the antecedents of slack that have noteworthy importance relative to how firms generate and choose to different forms of slack. Particularly, Sharfman et al. (1988) suggest three internal and external factors affecting the accumulating and use of slack; organizational characteristics, risk-taking behaviours and environment.

Several studies <sup>54</sup> have also supported these factors and proposed linkages among organizational characteristics, risk-taking behaviours, environmental conditions, and performance outcomes. (Thompson, 1967). The specific relationship between factors that influence slack -development was illustrated in Table 2.4.

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<sup>54</sup> Some relevant references are (Bromiley, 1991, Fiegenbaum and Thomas, 1988, Torben, 2009, Li and Tang, 2010, Miller and Chen, 2004, Moses, 1992, Singh, 1986, Tsai and Luan, 2016, Zhu and Chen, 2015, Aragon and Sharma, 2003, Azadegan et al., 2013b, Bradley et al., 2011a, Nadkarni and Chen, 2014, Kraatz and Zajac, 2001, Thomas, 2013, Wang et al., 2016a).

Table 2-4- The Slack Management and Functions of Slack

Three Dimensions	Functions of Slack	Slack in Operation	Decomposition of Functions of Slack	The Component of Slack Functions	Key authors
<b>Organizational Characteristics (Internal)</b>					
<i>Resource Capability</i>	Inducement and conflict resolution	Managing generation and investment of slack	Slack as inducement , conflict resolution and a resource for manoeuvrability	Allocating, diversifying and deploying slack through resource flexibility and resource commitment	Barnard (1940); March and Simon (1958); Cyert and March (1963); Pondy (1967)
<i>Adaptation Capacity</i>	Satisfying	Number of alternative processes generated or considered for adaptation	Slack as a facilitator of strategic (adaptation) or Slack as a source for agency problems	Framing and strategizing adaptation profile through alignment and adaptability processes	Simon (1957); March and Simon (1958)
<b>Risk-Taking (Internal)</b>					
<i>Strategic Risk</i>	Innovation	Exploration activities	Slack as a facilitator of risk-taking or Slack as a source for agency problems		Cyert and March (1963); (Hambrick and Snow, 1977)
<b>Environment (External)</b>					
<i>Environmental Conditions and Financial Crisis</i>	Workflow Buffer	Absorbing Shocks	Slack as a buffer for the external environment	Creating strategic options	Pondy (1967); Thompson (1967); (Galbraith, 1973)

First, organizational characteristics have two components which have a substantial influence on allocation of excess resources and redeployment (Gong and Shi, 2007); (1) *resource capability* and (2) *adaptation capacity*. In one sense, resource deployment shapes firms' characteristics (Ocasio, 1997, Zott, 2003) and adaptation profiles (Meyer, 1982), especially during uncertainty.

Second, in an original statement, Sharfman et al. (1988) focused on “values and beliefs of the dominant coalition” of firms, which described risk attitude and tendency towards political behaviour. Risk-taking behaviours was separated in a way that is *risk averse* and *risk-seeking* (Mahto and Khanin, 2015, Moses, 1992, Singh, 1986, Hambrick and Snow, 1977).

The third factor is the *environmental condition* of industries in which the managers chooses to increase firms' competitive advantage (Christmann, 2000). It plays a significant role in respect to how firm resources are allocated (Gong and Shi, 2007). In other words, the degree of environmental *munificence* and *dynamism* influences how much slack resources the organizations should *acquire*, *assimilate*, *transform* and *exploit* for itself or accumulate and stock for the potential future opportunities in the industry (Zahra and George, 2002, Gao et al., 2008).

Existing literature places considerable attention on each of the concepts and their implications for organizational outcomes. Integration of these three concepts and examination of the multifaceted interrelationships between their key variables may be accomplished through a uniform model.

In this study, an overall conceptual framework was drawn for the initial model construction from concepts in which a firm is evaluated as a model of context process (organizational characteristics), risk (risk-taking behaviours), (environment), and output (performance) (Bradley et al., 2011a, Tsai and Luan, 2016, Chakravarthy, 1986, Oktemgil and Greenley, 1997).

Overall, designing the firm to align internal and external changes has been a central principle of strategic choices. The organizational capabilities and characteristics are the results of its adaptation to the environmental changes (David et al., 2002). When adapting a strategy, firms must consider organizational characteristics, risk-taking behaviours, and the environment (Bromiley, 1991, Bradley et al., 2011b). Given that factors are the result of firms' adaptive choices, coherence among these choices and being in harmony with each other are significant when considering that this harmony influences the firm's performance.

Additionally, achieving congruency in choices between these factors has important implications on firm performance. These three dimensions will be discussed in detail in further sections. However, relevant literature was dipped into briefly on related concepts of interest is also mentioned, as follows:

#### 2.1.1.4.1. Organizational characteristics (Internal)

The notion of organizational characteristic has two important components that facilitate creating strategic options for uncertainty: (1) *resource capacity* and (2) *adaptation capacity*. First, organizational characteristics reflect the time-varying resources as the outcome of the strategic decisions to flexibility-commitment of a firm's resources (Li and Li, 2010). During the financial crisis, managers choose to commit firm resources for a stable (unstable) period, and, therefore, maintain commitment (flexibility) in better exploiting the potential opportunities (Dooley and Fryxell, 1999, Kulkarni and Ramamoorthy, 2005, Ruiz, 2006).

Overall, fluctuations of the time-varying resources between resource-commitment and resource-flexibility offer managerial insights in resource allocation that can bring superior results in firm performance in uncertain environments. Second, adaptation is essential for the survival of firms in industry.

Therefore, the current study pays special attention to the "*process of adaptation*" that firms need to keep conducting in their activities when facing an unexpected and rapidly changing environment. It is important to clarify where firms are successful in adapting to financial crisis and understand the factors that provide the environmentally proactive or reactive adaptation strategies based on the level and characteristics of resources (Busch, 2011, Chakrabarti, 2015, Chakravarthy, 1982, Holland, 1995, Kirkwood and Price, 2006, Kiss and Barr, 2014, Sternad et al., 2011, Stieglitz et al., 2015).

Adaptability and alignment are two important factors when firms propose to adapt to environment (Bordoloi et al., 1999, Ben et al., 2016, Thongpapanl et al., 2012, Weigelt and Sarkar, 2012). Firms' *adaptability* is an indicator of temporal flexibility and refers to being flexible when the environment changes (Chatman et al., 2014, Bordoloi et al., 1999, Weigelt and Sarkar, 2012). Although flexibility is crucial for competitive advantage, adaptability is a need for firm's survival because it is about adapting to unexpected pressures during the environmental jolt (Meyer, 1982, Venkataraman, 1998, Wan and Yiu, 2009).

However, *alignment* can be seen as a state of fit, which requires a stable environment (Bennett III et al., 1994, Corsaro and Snehota, 2011, Ghobadian et al., 2007, Knoll and Jarvenpaa, 1994, Powell, 1992, Tosti and Jackson, 1994). Alignment can also be viewed as a snapshot, internal and external balance (Milliman et al., 1991, Sanchez, 1995). Overall, resource capability and adaptation capacity are two important dimensions that directly influence firms' slack development and allocation preferences.

#### 2.1.1.4.2. Risk-taking behaviours (Internal)

Slack resources enable the taking of risky initiatives and increase risk-taking capabilities (Shimizu, 2007). Such risk capabilities can also improve and increase managerial confidence (Chatterjee and Hambrick, 2011) when making risky decisions. Thus, threat conditions relative to the environment firms operate in pre-crisis, crisis, and post-crisis performance, and related risk-taking activities, must be factored into the bigger picture, as they and their interaction can affect risky investment decisions firms have made. Concerning the interactive effect of organizational slack, environmental velocity, and risk-taking capabilities from the perspectives of *prospect theory* and *threat rigidity theory* can make a contribution the organizational slack literature.

The following proposition that “*slack facilitates risky actions in response to threats and opportunities*” and “*both an internal and external reference point will outperform firms which are predominantly internally or externally focused*” Fiegenbaum et al.’s (1996: 229), firms can frame and strategize their adaptation profile by focusing internal and external reference points.

#### 2.1.1.4.3. Environmental conditions (External)

Organizational theorists suggested that the environmental conditions have significant impacts on organizational functioning (Das and Teng, 2001, Moses, 1992, Zona, 2012, Singh, 1986, Gral, 2013). Munificence and dynamism are two distinct and commonly used environmental factors that were initially suggested by Dess and Beard (1984). Environmental munificence can be described as “*the abundance of resources in the environment*” (Boyd, 1995): 305). An environment with larger munificence facilitates having larger capacity for firm growth (Chen, 2015b, Goll and Rasheed, 2004, Martínez et al., 2014, Park and Mezias, 2005).

Conversely, environmental scarcity may minimize the growth opportunities (Park and Mezias, 2005). The environmental munificence influences resource-commitments, availability of financial resources and may stimulate slack generation behaviours (Aragon and Sharma, 2003, Kulkarni and Ramamoorthy, 2005, Dolmans et al., 2014, Gong and Shi, 2007, Singal and Jain, 2016).

Firm growth enables firms to generate slack resources (Cyert and March, 1963), which help firms by creating a buffer when external resources are limited (Klingebiel and Adner, 2015). Environmental dynamism refers to volatility, uncertainty and instability that are the result of the degree of change (Withers and Fitza, 2017). It is generally recognized that competition is quite fierce for firms in a dynamic environment.



Scholars accept that coping with environmental dynamism is important (Thompson, 1967) and such environments can be expected to affect slack accumulation and resource deployment of firms (Cheng and Kesner, 1997). The lower dynamism in the environment reflects linear and predictable changes (Eisenhardt and Martin, 2000, Azadegan et al., 2013b, Chen, 2015b) as well as relative stability in the industry. Conversely, higher dynamism in an environment refers to a greater level of nonlinear and unpredictable changes as well as relative instability in the industry (Larrañeta et al., 2014, Nadkarni and Chen, 2014, Ricciardi et al., 2016, Schilke, 2014, Cannella et al., 2015, Withers and Fitza, 2017)

#### 2.1.1.5. The Fields of Potential and Functional Use

In order to examine potential and functional fields of slack utilization, prerequisites for slack utilization should be examined more closely, in general. The level of divisibility, fungibility, visibility and employability of slack resources determine the factors that are very important for utilization of slack. Slack can be developed within the organization intentionally or unintentionally depending on the conditions in which firms operate.

Secondly, slack resources can be used to create various alternatives for managers. These alternatives are shaped by environmental conditions and demands. Availability or recoverability of slack resources also affect the objectives of firms depending on form and level of slack. There are generally two fields of slack usage. '*Potential use*' implies possible fields of slack use in general. Similarly, '*functional use*' refers to main functional position of slack in a causal relationship. In order to obtain more reliable and extensive research, the most cited top two studies were summarized briefly, which were drawn from 'web of science citation report' for each subsection.

#### 2.1.1.5.1. Potential Use

Past literature on organizational slack has been examined from various perspectives. These are (1) innovation, (2) mergers and acquisitions, (3) risk taking, (4) growth, and (5) performance, respectively. In this section, the potential fields of excess resources are described as follows:

##### *(1) Slack for Innovation*

The most cited study in ‘*citation report*’ regarding slack-innovation relationship is that of Nohria and Gulati (1996). They investigated that whether excess resources are a catalyser or preclusive for innovation. They also proposed two fundamental components to describe the slack-innovation interaction. The first one is the impact of slack on experimentation and the second one is the impact of slack on discipline implemented over experiments in shifting environmental contexts.

Another significant finding of Nohria and Gulati (1996) is the “*inverse U-shaped curvilinear relationship in between slack and innovation*”. Further, they mentioned several factors that could be the subject of future research: risk-taking behaviours in a more dynamic model, including, innovation, performance, risk, and the level of slack (Nohria and Gulati, 1996:1260). The second most cited research is the study of Mellahi and Wilkinson (2010).

These researchers examined, in particular, the influences of the lessening in size of slack economising vis-à-vis the upscaling of production. Their findings were that economising does not impact updating in a major way. However, two years after downsizing have a significant influence on firm innovation. Their unique contribution is the ‘*impact of sudden decline in slack*’ on innovation (Mellahi and Wilkinson, 2010; 502).

### *(2) Slack for Merger and Acquisitions*

Increasing the level of slack resources provides firms with less costly debt financing (Smith and Kim, 1994, Bourgeois, 1981). Thus, slack may facilitate successful merger and acquisitions (Uhlenbruck et al., 2016, Dutta et al., 2016) when they need additional financing. In their study, Iyer and Miller (2008) investigated the effects of performance, slack, hazards of acquisition and proximity to bankruptcy. It was discovered that a major gap exists with entities executing below and above their desired goals in the context of mergers and acquisitions (Iyer and Miller, 2008).

In general, they found that slack exploration is relevant to explaining the timing of acquisition (Carnes et al., 2016). Similarly, Wan and Yiu (2009) has scrutinized the performance implications of corporate acquisitions with regards to environmental jolt and industry conditions. They also compared corporate acquisitions before and after environmental jolts with during a jolt. Wan and Yiu (2009) suggested that slack resources would increase firm performance. Further, slack has positive implications on performance and corporate acquisitions during an environmental jolt.

### *(3) Slack for Growth*

The growth theory of Penrose (1959) suggests that excess resources create opportunities for firm growth. Furthermore, utilization of slack resources facilitate organization expansion in different environmental conditions (Bradley et. al, 2011). Viewed from this perspective, it can easily be concluded that excess resources have a positive influence on firm growth<sup>55</sup>.

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<sup>55</sup> In the context of human resource and financial slack resources, Mishina et al. (2004) scrutinized whether additional slack are continually better for growth.

Mishina et al. (2004) found that human resource slack increases short-term market expansion. They separated firm resources in two categories related to organizational slack; (1) property-based resources and (2) knowledge-based resources.

They found that knowledge-based resources create swifter impacts on international growth than property-based resources. It is an acknowledged-fact that resources are a significant influence on firm growth.

#### *(4) Slack for Risk-Taking*

Change in an organization is inevitable (Mintzberg, 1985, Eisenhardt and Martin, 2000, Worley and Mohrman, 2014). Environmental uncertainty and thus risk-taking play a significant role on firm decision-making (Krishnan et al., 2016, Buckley et al., 2016, Tsai and Luan, 2016). Best-known slack research on risk-taking is the study of Singh (1986).

He investigated the interaction between firm performance and risk related activities in decision-making and the mediated effect of slack resources on this relationship<sup>56</sup> (Singh, 1986). However, Singh (1986) argued that committed excess resources are related to high risk-taking while available slack does not have any significant relationship with risk-taking.

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<sup>56</sup> Singh (1986) suggested that low performance is positively associated with high level of taking risky initiatives and greater performance is associated with low level of taking risky initiatives, in general (Singh, 1986). He further found that better performance is positively associated with available and highly committed slack.

### *Slack for Performance*

The slack-performance relationship is the quite often discussed theme in the earlier studies. (Fadol et al., 2015, George, 2005, Ghosh and Taylor, 2016, Gong and Shi, 2007, Ju and Zhao, 2009, Kim and Kim, 2016, Kuusela et al., 2016, Lee and Wu, 2015, Wefald et al., 2010, Xu et al., 2015).

Various studies examined factors that influence the slack-performance relationship. The most cited article regarding the slack-performance relationship is a research of Tan and Peng (2003). They investigated whether the interaction between performance and excess resources is linear or nonlinear.

Their outcome exhibited that there was the curvilinear link<sup>57</sup> between excess resources and performance. Similarly, Chiu and Liaw (2009) examined the association between performance and excess resources in the context of tactical development of firms and variations in slack. They found that the slack-performance relationship differs based on form of slack and business strategy. Chiu and Liaw (2009) also identified nonlinear interaction between performance and excess resources.

In a similar vein, Marlin and Geiger (2015b) studied the slack-performance relationship by using a configurational approach. They suggested that greater levels of excess resources provide greater performance and that expected that a positive association between them (Marlin and Geiger, 2015).

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<sup>57</sup> They found that the range of excess resources offer an optimal level for firm performance rather than excess resources being persistently bad or good for performance.

#### 2.1.1.5.2. Functional Use

Various conceptual and methodological factors can influence the functional role of organizational slack in examining the multiple outcomes of studies.

##### (1) Slack as Moderator

Daniel et al., (2004) suggested two potential moderator roles of slack in the slack-execution rapport: (1) industry-linked running and (2) lagged slack. Daniel et al., (2004) pointed out that potential industry effects have been acknowledged by slack literature.

Controlling industry effects increases reliability of research when examining various forms of slack (Daniel, et al., 2004). However, changes in levels of excess resources can influence future performance (Luncheon et al., 2015, Stan et al., 2014, Kuusela et al., 2016, Cheng and Lin, 2012).

Hence, chronology may be instrumental in explicating both incidental route and extent of relationship. It is clear from the previous studies that firms cannot immediately transform or assimilate their absorbed slack in the event of crisis (Bourgeois and Singh, 1983).

Therefore, implications of slack on performance cannot be seen immediately<sup>58</sup> (Stan et al., 2014, Argilés et al., 2016, Vanacker et al., 2016). Given this temporal issue, if lag year is not considered, then the real influence of slack cannot be measured properly (Daniel et al., 2004).

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<sup>58</sup> However, changes in levels of excess resources can influence future performance (Luncheon et al., 2015, Stan et al., 2014, Kuusela et al., 2016, Cheng and Lin, 2012).

## (2) Slack as Predictor

Slack has not been used directly in measurement as a predictor variable. However, it has been used to measure the factors that were mentioned above, such as risk-taking, firm growth, and innovation. For example, in some studies, risk-taking was demonstrated as debt financing (potential slack), innovation was measured as heavy R&D or patent intensity (absorbed or recoverable slack), and growth as firm size or investment in market and so on (absorbed slack).

## (3) Slack as Outcome

Different slack classifications, alternative approaches and measurements produced a variety of dissimilar slack which were used as financial gauges of a number of features in the organisation (Su et al., 2009, Suzuki, 2016, Thomson and Millar, 2001, Wang et al., 2016b, Wiengarten et al., 2016, Xu et al., 2015). Organizational outcomes depend on many factors that are related to leading to maintaining organizational survival; furthermore, outcomes can be accumulated as tangible and intangible resources (Carnes et al., 2016, Agarwal et al., 2009, Du et al., 2014, Galbreath and Galvin, 2004, Kraatz and Zajac, 2001). Therefore, financial measurements varies depend on different forms of excess resources.

### 2.1.2. Slack-Performance Relationship

Firm resources and performance are important variables in the previous studies since the concept of slack has received significant attention from different research streams<sup>59</sup>. Slack can be seen as a benefit because it can protect firms against fund shortages and act as a buffer against unexpected external interventions<sup>60</sup>.

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<sup>59</sup> Some relevant references are (Jifri et al., 2016, Ju and Zhao, 2009, Kuusela et al., 2016, Latham and Braun, 2009a, Liu and Fu, 2016, Lungeanu et al., 2015, Mizutani and Nakamura, 2014, Orlando et al., 2016, Paeleman and Vanacker, 2015, Peng et al., 2010, Shahzad et al., 2016, Stan et al., 2014, Tan and Peng, 2003, Vanacker et al., 2016, Wefald et al., 2010, Zambuto and Nigro, 2014).

<sup>60</sup> Some relevant references are (Argilés et al., 2016, Azadegan et al., 2013a, Bourgeois and Singh, 1983, Bourgeois, 1981, Bowman et al., 2005, Bradley et al., 2011b, Cheng and Lin, 2012, George, 2005, Hendrick, 2006, Murro et al., 2016)

These studies have shown that degree and form of slack can change relationship with perspectives like risk-taking behaviours (Singh, 1986), adaptation (Geiger and Gashen, 2002), environment (Bradley, 2011) and with firm performance<sup>61</sup> (Banalieva, 2014, Chen et al., 2015, Chen and Huang, 2010, Chen et al., 2013, Fadol et al., 2015).

Additionally, slack research has employed various slack measurement and have obtained different performance results (Mizutani and Nakamura, 2014). Nevertheless, each perspective mentioned above requires a theoretical background. Next section will be discussed slack related theories briefly.

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<sup>61</sup> Facó and Csillag (2010) pointed out that the lack of resources or surplus resources (*physical, economical innovational, human* etc.) may influence the operative performance of firms. They also further noted that the concept of slack and performance can be considered from a perspective that, simultaneously, can allow for inducement for favourable circumstances, and also expenses and losses that negatively impact firms' outcomes (Murro et al, 2016).



#### 2.1.2.1.Theories

As mentioned before, disagreement between slack and performance relationship can be gathered under the three main disagreements in the literature.

##### 2.1.2.1.1. Slack and Resource Based View (RBV)

RBV is an important perspective that interprets characteristics of slack resources when the environment changes (Liu et al., 2014). Penrose (1959) promoted the importance of bundle of resources to a firm's growth.

She posited that excess resources are a significant factor of firm sustainability (Wang et al., 2016b, Lungeanu et al., 2015). Therefore, in terms of RBV, organizational slack is one of the determinants to achieve business objectives as well as survival (Paeleman and Vanacker, 2015, Vanacker et al., 2016). In addition, according to RBV, slack is one of the most significant preconditions for achieving short and long-term sustainable competitive advantage<sup>62</sup> (Mousa and Chowdhury, 2014).

The development and allocation of slack depends on difficult to replicate, rarity, being valuable, and non-replicable of resources and thus it provides firms to exploit current opportunities and to buffer future threats. (Barney, 1991, Lecaona and Reitzig, 2014). RBV also suggests that organizations have a continuous adaptation cycle while the competitive advantage lasts<sup>63</sup> (Schlesinger and Doyle, 2015).

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<sup>62</sup> Based on the previous study of Wernerfelt (1984), several researchers have contributed to the development of the RBV (Verbeke and Yuan, 2013, Bromiley and Rau, 2016, Kozlenkova et al., 2014, Cheng and Lin, 2012, Hitt et al., 2016, Facó and Csillag, 2010). By focusing on the firm-specific resources within the organization, the key question, which RBV seeks to address, is why some organizations are more successful than others (Barney and Clark, 2007). One logical explanation lies at the bottom of development and the deployment of resources (Argilés et al., 2016, Du et al., 2014, Huesch, 2013).

<sup>63</sup> From this perspective, RBV addresses maintaining a sustained superior performance as well as organizational flexibility necessary to adapt to changing environment successfully (Mishi et al., 2016, Tsai and Luan, 2016, Klingebiel and Adner, 2015).

Resource-capability refers to successfully exploiting and deploying firms' resources, while these resources refer to the essential organizational assets (Newbert, 2008). According to this thought, firms' strategies must depend upon specific resource-capabilities (Felin et al., 2012) and such capabilities are vital for any required adaptation moves and changes in response to expected or unexpected environmental changes (Chakrabarti, 2015, Kirkwood and Price, 2006, Stieglitz et al., 2015).

From the adaptation perspective, firms choose strategies to adaptability based upon firm's resource availability (Grant, 1991, Busch, 2011, Chakravarthy, 1982, Hutcheon, 2012). Firms can earn higher returns than average firms' returns by generating and committing excess resources that are critical to maintaining its competitive advantage (Greenley and Oktemgil, 1998). Therefore, firms seek to develop and generate unique sets of resources to enhance firm performance and thus increase competitiveness of firms<sup>64</sup> (Dolmans et al., 2014).

The changing conditions, however, in the environment appear to positively increase firm performance by investing resources available; this is because investing these generated excess resources enables a firm to create real options promptly (or flexibility) (Bordoloi et al., 1999, Combs et al., 2011, Ford et al., 2002, Kortmann et al., 2014, Lee et al., 2009).

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<sup>64</sup> The RBV underlines the performance implications of available excess resources (Liu et al., 2014, Bradley et al., 2011b). The firm-specific resources must be valuable to allow implementation of adaptation strategies that increase its efficiency and effectiveness (Bordoloi et al., 1999, Kortmann et al., 2014, Weigelt and Sarkar, 2012). Similarly, if a firm's resources are rare, the firm gets a chance to implement a unique adaptation strategy among its rivals (Anderson and Tushman, 2001, O'Reilly and Tushman, 2013). Furthermore, these resources must be difficult to imitate, replicate, or substitute for other firms to maintain competitive advantage among the competitors (Newbert, 2008). The valuable and difficult to imitate firm-specific resources can bring firms into the forefront and differentially reward their actions in competition with firms from the external environment (Bradley et al., 2011a, Koberg, 1987, Lengnick and Beck, 2005, Morrison, 2011, Russo and Fouts, 1997). Specifically, using current generated excess resources in new ways to enhance firm performance is valued most highly by the demands from new changed environment (Smart and Vertinsky, 1984, Venkataraman, 1998, Voss et al., 2008, Wan and Yiu, 2009).

Additionally, the absence of slack resources in a such condition may lead to performance destruction (Barreto, 2012, Desai, 2016, Tyler and Caner, 2015). RBV theory states that variance in performance change depends on differences of organizational characteristics<sup>65</sup> in terms of competition on resources available (Barney, 1991).

#### 2.1.2.1.2. Slack and Resource Constraint Theory (RCT)

Resource constraint theory (RCT) is included within the economic theory (Schulz and Flanigan, 2016, Luo et al., 2013, Chiu and Liaw, 2009, Fonseka et al., 2014, Jones and Jayawarna, 2010). RCT suggests that entities with lesser assets are more liable to exploit their functioning more effectively as businesses are forced to stretch and leverage the resource at hand (Baker and Nelson, 2005, George, 2005).

Therefore, necessary slack creation is elucidated through distinctive adaptation strategies in resource-scarce environments rather than through the natural value of the resources themselves (Luo et al., 2013). This theory predicts decision-makers are compelled to change their attitudes to increase the synergy between each other in accumulating resources. (Chiu and Liaw, 2009). Therefore, slack resources must be eliminated from the organization because it is always considered undesirable (George, 2005).

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<sup>65</sup> Particularly, firms with superior adaptation capacity and distinct resource capabilities can achieve a desired level of competitive advantage as well as firms with managing existing resources efficiently and effectively to provide performance increase (Morrow et al., 2007, Sirmon et al., 2007). This performance increase occurs as firms adapt to a changed environment to maintain sustainability or competitive advantage, while sequentially or simultaneously maintaining or improving long-term profitability, thereby creating wealth for shareholders (Sirmon et al., 2007, Hoopes et al., 2003). Firms' specific resources can be transferred and traded, however, firm capabilities are unique and hard to imitate (Voss et al., 2008). One of the main motivation of organizational adaptation is result from the available excessive slack resources. Specifically, the status of resources - (ready-to-commit or generating excess resources to fill resource gap) determines the adaptation strategies depends on different environmental conditions.

Although scarce slack resources hinder firm performance by minimizing resource flexibility to respond to environmental changes, surplus resources can also be problematic if it limits efficient allocation of resources (Schulz and Flanigan, 2016). According to RTC, even though possessing less slack, deploying the available slack effectively and efficiently is the key to achieving the desired performance outcomes (Baker and Nelson, 2005). Less slack is expected to enable and encourage managers to explore activities and achieve successful results (Jones and Jayawarna, 2010).

RTC argues that firms with superior adaptive ability can be more resilient and robust in an environment characterized by resource scarcity. Fewer resources may also stimulate proactive activities effectively during the environmental uncertainty (Chiu and Liaw, 2009, Baker and Nelson, 2005).

Limited resources are a critical stimulus to discover new resources and opportunities (George, 2005). In addition, scarce resources limits over-optimism among the managers that determine firms' resource position; such position prevents firms from premature strategic manoeuvres (Schulz and Flanigan, 2016). A limited level of slack, therefore, may lead to more proactive behaviours such as taking risky initiatives.

#### 2.1.2.1.3. Slack and Behaviour Theory of Firms (BTF)

Specifically, BTF<sup>66</sup> mainly focuses on the external and internal environmental problems, ‘imperfect environmental matching’, ‘unresolved conflict’, ‘bounded rationality’ and the issue of ‘organizational slack’(Pitelis, 2007, Penrose, 1959):478). ‘Imperfect environmental matching’ addresses the importance of ‘adaptation’ and pointing to fitting of endogenously (organization) and exogenously (environment) given organizational structure for the change (Bourgeois, 1981, Arora and Dharwadkar, 2011, Greenley and Oktemgil, 1998, Shen et al., 2014, Parker and Witteloostuijn, 2010).

It pays special attention to the interaction between ‘slack’ and ‘performance’ (Pitelis, 2006). BTF suggests that slack-oriented organizational development positively related to firm performance, enhances proactive strategies (Álvarez et al., 2007). It considers slack as allowing for creative activities and buffering the adaptational capacity in response to environmental shocks (George, 2005) and hence improves its performance (Pramanik et al., 2015, Sternad et al., 2011).

‘Organizational slack’ is at the very core of BTF (Gong and Shi, 2007) and Cyert and March (1963) considered excess resources as a possible solution to scarcity and “success tends to breed slack. One of the main consequences of slack is a muting of problems of scarcity” (Cyert and March, 1963) p. 189). Organizational theorists such as Thompson (1967) and Barnard (1940) also argued that slack is essential factor in order to shield the core of businesses from unpredicted environmental changes.

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<sup>66</sup> (BTF) suggests that an organization looks like an organic body that relentlessly pursues survival (Cyert and March, 1963, Thompson, 1967, Cheng and Lin, 2012).

According to the BTF, ‘organizational slack’ generally exists in successful firms because ‘slack’ could enable adaptation to ‘long-run survival of the firm’ (Cheng and Lin, 2012). The slack-related part of behaviour theory was derived from its ability to imply firms’ strategic actions positioned a great variety of industries (Argote and Greve, 2007)

#### 2.1.2.1.4. Slack and Agency Theory (AT)

Agency theory<sup>67</sup> proposes that ‘slack is good’ for the firms only in case of decision-makers acting as agents. The allocation of resources and the strategic posture of decision-makers may be a determinant for firm activities (Álvarez et al., 2007). Short-termism leads to an agency problem because decision-makers and some shareholders (Bolton et al., 2006) prefer shorter-term profits rather than longer-run profitability (Martin et al., 2015).

Firm decision-makers can be assumed to be opportunistic (Chenhall, 2003), therefore, decision-makers can use slack unproductively for self-serving projects (Daniel et al., 2004, Zona, 2012), temporal preferences (Martin et al., 2015) and their personal agenda or private gains. They may feel free to follow more risky strategies (Geiger and Makri, 2006, Wu and Tu, 2007) and therefore can move away easily from the current aligned and adapted principles and trajectories.

Bourgeois (1981) found that too much excess resources may encourage decision-makers’ behaviours that can have harmful implications for firm performance (Lin et al., 2009a, Nohria and Gulati, 1996) and lead to ‘breed inefficiency’ in organization. This issue was regarded as a source of agency problem (Tan and Peng, 2003).

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<sup>67</sup> Contrary to BTF, according to Justin Tan and Peng (2003), agency theory clearly refuses the perspective that the firms is like an organic body.

According to the agency theory<sup>68</sup>, slack should be reduced to an optimal level in the firm activities to minimize these possibilities (Daniel et al., 2004, Phan and Hill, 1995). The agency theory and environmental dynamism suggest that internal resource availability should be fitted/aligned to external resource demand (O'Brien, 2003). Too much slack may decrease the adaptational capacity to the changing environment (Álvarez et al., 2007) and well-used slack resources enhance the firm performance only if in the case of successful adaptation.

#### 2.1.2.1.5. Slack and Prospect Theory (PT)

Prospect theory has attracted much attention from management studies in terms of firm risk-taking preferences (Martin et al., 2015, Kuusela et al., 2016, Barreto, 2012, Hambrick, 2003, Seck et al., 2016, Shimizu, 2007, Tversky and Kahneman, 1992, Zona, 2012). It was first developed by Kahneman and Tversky (1979).

Prospect theory<sup>69</sup> specifies variable risk preferences, which can be in the way that risk-seeking or risk-averse against firm's gains and losses (Xu et al., 2015). It also suggests that firms show different risk preferences in different environmental conditions, and may be either risk taking or risk averse, depending on their adaptation strategy (Greenley and Oktemgil, 1998).

In the context of a financial crisis, previous studies evidenced that some firms tend to be risk-averse (Ma et al., 2014, Makkonen et al., 2014, Meier et al., 2013, Wan and Yiu, 2009). If firms can anticipate large losses in a state of financial crisis, they will be more likely to undertake actions that reduce such risks (Mishi et al., 2016, Singh, 1986).

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<sup>68</sup> Therefore, agency theory could better explain the negative association between slack and performance (Tsai and Luan, 2016).

<sup>69</sup> Although this theory was born in laboratory environment, it has been extended by management scholars to organizational-level perspective to explain firm's risk preferences (Miller and Chen, 2004, Zona, 2012). The addition of such single level to firm level theory needs integration of the unique firm resources and capabilities at the firm level (Oktemgil and Greenley, 1997). For example, firms' slack management capability and adaptive capacity may provide firms a complementary perspective by enabling investigation of firm risk-taking capabilities as a function of organizational characteristics (Zona, 2012).

Similarly, firms will choose risk-avoiding strategies rather than risky actions for future survival, if there is a large potential losses and high uncertainty in the environment (Zona, 2012, March and Shapira, 1987). Firms will also refrain from risk-taking due to resource constraints during the financial crisis (Palmer and Wiseman (1999). It is commonly agreed that one of the main goals of decision-makers<sup>70</sup> in an organization is to increase shareholder wealth (Oswald and Jahera, 1991, Wowak et al., 2015).

Firms will take precaution against unpredicted environmental changes and, they will reduce risky investment such as R&D projects, inventory and marketing expenses during crisis (Venkataraman, 1998, Wan and Yiu, 2009, Makkonen et al., 2014, Meier et al., 2013). However, excess resources reflect organizational characteristics and therefore shape firms' risk preferences before, during and after the financial crisis (Hong and Shin, 2016, Reinhart and Rogoff, 2011, Tan and See, 2004, Carbo et al., 2016).

Since slack refers to “*the pool of resources in an organization that is in excess of the minimum necessary to produce a given level of organizational output*” (Nohria and Gulati, 1996):1249), it increases firm proclivity towards investment for future survival. Slack resources help firms to reduce such a risk and enable to continue to apply risky project under the uncertainty.

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<sup>70</sup> However, in a condition of major latent losses, resource constraints, or bankruptcy, financial uncertainty will lead to financial scrutiny and makes decision-makers more cautious (Sanders, 2001).



Slack<sup>71</sup> “*provides the flexibility necessary to adapt resource allocation levels as projects progress over time*’, *‘facilitates adaptation to the ebbs and flows of the innovation process’*” (Nohria and Gulati, 1996):1249) and helps firms to achieve desired short-term and long-term performance. This process-capability enables firms to improve overall goodness-of-fit or alignment, by exploiting the current environment to improve short-term performance<sup>72</sup> (Thongpapanl et al., 2012).

#### 2.1.2.1.6. Slack and Threat Rigidity Theory (TRT)

Environmental jolts lead to rigid responses if firms do not possess sufficient slack resources (McKinley et al., 2014, Park and Mezias, 2005, Pramanik et al., 2015). Decreases in firms’ available resources threaten managers. Resource constraint may be interpreted by shareholders as a sign of managerial incompetence and management inefficiency (Shimizu, 2007). Thus, decision makers are likely to be responsible and displaced when firm performance is at an unfavourable level. Additionally, shareholders may believe that managers are responsible for reduced firm performance. TRT suggests that managers in times of sustained resource scarcity prefer to avoid risk-taking and concentrate on current performance (Ren and Guo, 2011). Managers may take initiatives to protect their positions in a way that reducing adaptation activities that require highly risk-taking (Chakravarthy, 1986, Chakravarthy, 1982).

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<sup>71</sup> In terms of slack resources, prospect theory can be moderator for organizational characteristics from the point of *risk-seeking* and *risk-averse* preferences (Bromiley, 1991, Latham and Braun, 2009b, Moses, 1992, Mundy et al., 2011, Singh, 1986, Mizutani and Nakamura, 2014, Shimizu, 2007). If decision-makers have a positive perception that ‘accumulating slack is a good thing for firm future survival’ and if firm fit with its environment, then they begin to generate slack resources to improve the current alignment of the organization (Paeleman and Vanacker, 2015, Pierce and Aguinis, 2013).

<sup>72</sup> However, if managers have a negative perception on accumulating excess resources, then firms may begin to reduce generating slack resources by creating several real investment options to improve the *adaptability* to ambiguous and uncertain future environments and in particular, improve the response capacity to adapt to future environmental threats and new opportunities while gaining long-term improvements in performance. Hence, during an environmental jolt, excess resources will play affirmative roles on firm risk preferences because they neutralize assorted disadvantages associated with risky investments.

Additionally, risk-taking will increase significantly in unexpected environmental shifts (Cheng and Kesner, 1997, Sharfman and Fernando, 2008). The increasing risk-taking is likely to lower managerial confidence to perceive potential performance outcome and, hence, lead them to minimize the motivation (Ginsberg, 1988).

These actions match with exploitative changes, which means alignment-oriented actions based on current knowledge (Benner and Tushman, 2003). TRT suggests that weak performance makes firms rigid. Rigidity prevents strategic adaptation that requires necessary changes in a right time and at a right place. (D'Aveni, 1994, D'Aveni, 1989a, D'Aveni, 1989b), risk-taking behaviours (Buckley et al., 2016, Koh et al., 2014, Tsai and Luan, 2016, Zhu and Chen, 2015) and domain changes (D'Aveni, 1989b). Put differently, threat rigidity theory characterizes a conservative strategy of maladaptive firms (Chakravarthy, 1982, Kiss and Barr, 2014, Pramanik et al., 2015, Sternad et al., 2011).

TRT generally argued that “*when faced with unexpected environmental jolts such as financial crisis, managers would tend to continue with their routine responses even they are misalignment with new environmental conditions*” (Staw et al., 1981):502). TRT predicts that managers with a below the performance aspiration will become rigid in their response to environmental change (Shimizu, 2007).

#### 2.1.2.1.7. Traditional Views

##### 2.1.2.1.7.1. Positive or Negative Perspectives

Several insights from the literature were offered in the case of the slack-performance relationship. The literature<sup>73</sup> demonstrated split evidence on negative or positive impact of slack and is quiet on its relationship with firm performance in the case of unexpected financial crisis. According to the agency theory perspective, an optimum level of slack resources may induce greater firm performance (Zona, 2012).

However, exceeding this level might lead to negative influence on the performance (Tan, 2003). Therefore, the level of slack must be minimized in organizational activities (Tan and Peng, 2003) as much as possible. Figure (2.5f) illustrates this relationship. However, resource constraint theory also suggests a negative perspective that ability to technological/innovational development may be attributed to the resource constraint and shortage of resource available (Bourgeois, 1981).

If the level of slack is low, then decision makers are more likely to use current projects more efficiently, as shown in Figure (2.5b). Conversely, RBV follows a positive perspective and argues that slack provides firms with increased organizational flexibility under the environmental changes (Barney, 1991, Bradley et al., 2011a, Bromiley and Rau, 2016).

RBV and BTF suggest that excess resources facilitate a proactive strategy and a buffer for threats (Bourgeois, 1981, George, 2005). Therefore, either too little or too much slack can damage firm performance (Tan, 2003). Figure (2.5e) illustrates this relationship. BTF views slack resources as taking risk, inducements for development of innovation, and making proactive strategic choices (Lin, 2014).

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<sup>73</sup> Some relevant references are (Bourgeois and Singh, 1983, Bourgeois, 1981, Cheng and Lin, 2012, Gral, 2013, Guha, 2016, Lee and Wu, 2015, Lee, 2015, Marlin and Geiger, 2015a, Mizutani and Nakamura, 2014, Sharfman et al., 1988).

As shown figure (2.5d), according to BTF, positive view suggests that slack can provide resource available for creative behaviour (Singh, 1986) and free up resource demands to firm adaptation by creating a new profile and options to regain fit to new changed environment. (Cyert and March, 1963, Donaldson, 2000, Lengnick and Beck, 2005, Tilcsik, 2014, Venkatraman and Camillus, 1984).

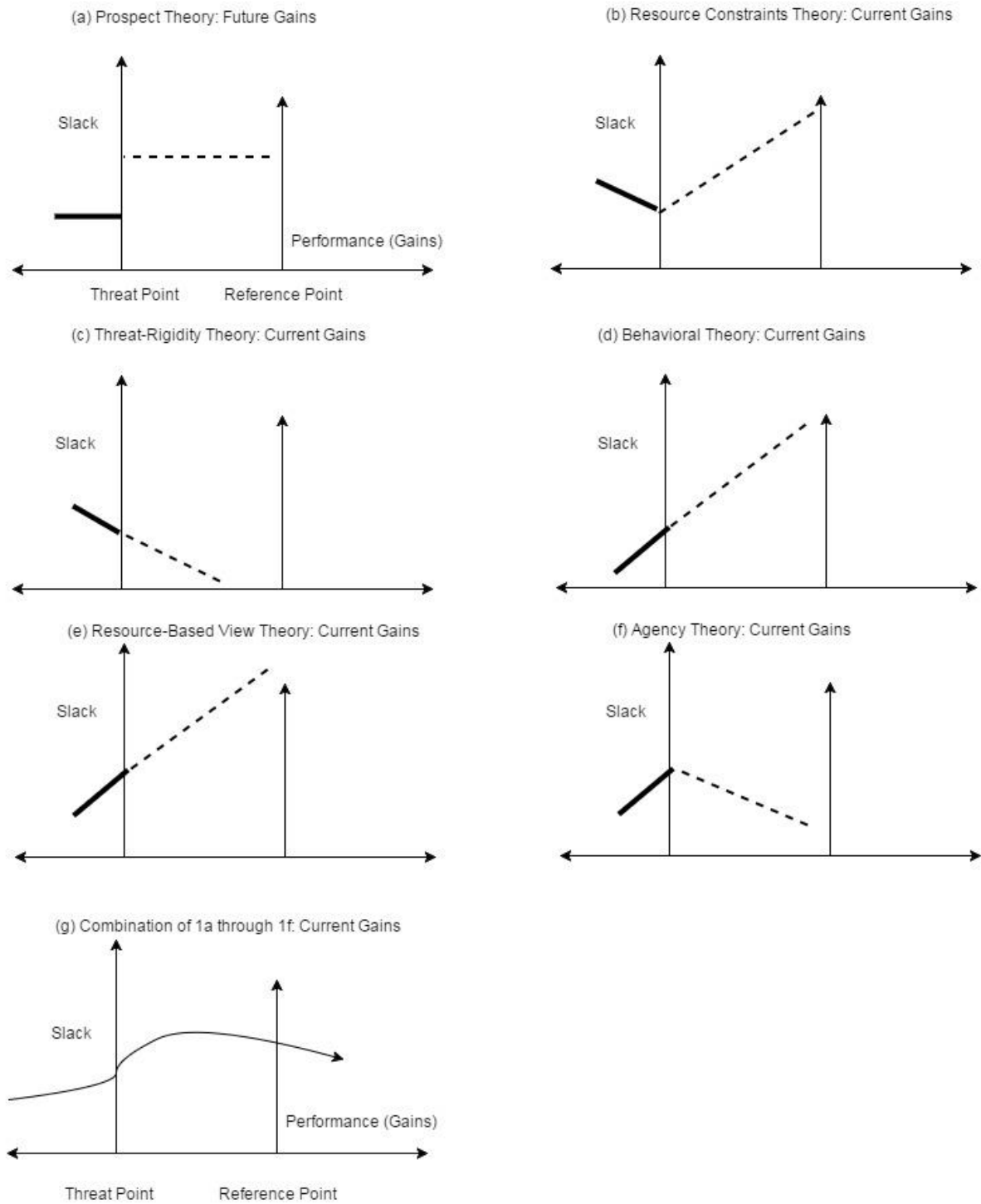
Viewed from the opposite angle, Jensen (1993) claimed that slack can lessen the innovational activities and this may lead to performance shortfall<sup>74</sup>. According to the agency theory<sup>75</sup>, only the managers benefit from holding excess slack resources when the level of slack accumulated too-much for firm activities.

Therefore, the presence of slack can inhibit or reject having alternative strategic options or taking initiatives for risky operations offered by influential managers (Tsai and Luan, 2016, Klingebiel and Adner, 2015). On the other hand, threat rigidity theory suggests a negative perspective for slack and argued that when a firm close to the survival point, this leads firm to become more rigid by engaging in extreme forms of risk aversion.

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<sup>75</sup> Hence, as mentioned earlier, slack leads to lack of discipline in the organization and increase possible inefficiency in the organization. Agency theory suggests that firm management may misuse slack resources in order to engage in their own benefits or wasteful investment in firm future survival (Geiger and Gashen, 2002, Salge, 2011, Tan and Peng, 2003). In addition, slack may lead to inefficiency in organization due to encouraging managers for self-serving behaviours that damage performance (Daniel et al., 2004).

### Predicted Single-Theory and Combined Effects



Note: Inspired by Shimizu (2007)'s framework.

Figure 2-5 – Predicted single and combined effects of slack related theories

The presence of higher levels of excessive slack thus leads to passivity in firm response and low exploration activities due to increasing firm risk. This relationship is illustrated in figure (2.5c). So far theories reviewed slack performance relationship from 'directly proportional' perspective. Put differently, higher slack implies higher performance or vice versa.

However, in contradistinction to other theory perspectives, prospect theory adopts exact opposite perspective and suggests an 'inversely proportional' perspective. It suggests that low level of slack can encourage firms to pursue more aggressive strategies when facing resource constraint, which illustrated in figure (2.5a). Figure 2.5 also illustrates predicted single and combined effects of slack related theories. Considering all six perspectives collectively indicates the combined hypothetical curve shown in figure 2.5f.

#### 2.1.2.1.7.2. Linear or Curvilinear Perspectives

However, multiple studies have found a curvilinear slack-firm performance relationship (Paeleman and Vanacker, 2015, Vanacker et al., 2016, Tang et al., 2014, Tan, 2003). Since firms are simultaneously affected by both resource exploration and exploitation, meaning the slack-performance relationship cannot be only a monotonic linear relationship (Nohria and Gulati, 1996) (see figure 2.6).

This relationship could also be curvilinear as well as linear. Even though excess resources absorb unexpected external financial shocks through its specific buffering mechanism, utilizing less excessive resources can minimize administrative misusing and allow for the more efficient application of new adaptation strategies (Chatman et al., 2014, Chrisman and Patel, 2012, Koberg, 1987, Morrison, 2011, Papachroni et al., 2015, Zona, 2012). The investigation of these moderating factors such as adaptation and risk-taking behaviours hence unclosed a curvilinear slack-performance relationship.

For instance, the slack-performance relationship is positive up to a certain point but inevitably turns negative (Bourgeois, 1981). Past many empirical studies have echoed this perspective and identified the presence of an inverse U-shaped slack-performance relationship (Paeleman and Vanacker, 2015, Mizutani and Nakamura, 2014). Figure 2.7 demonstrates both U-shaped and inverse U-shaped curvilinear relationships as follows.

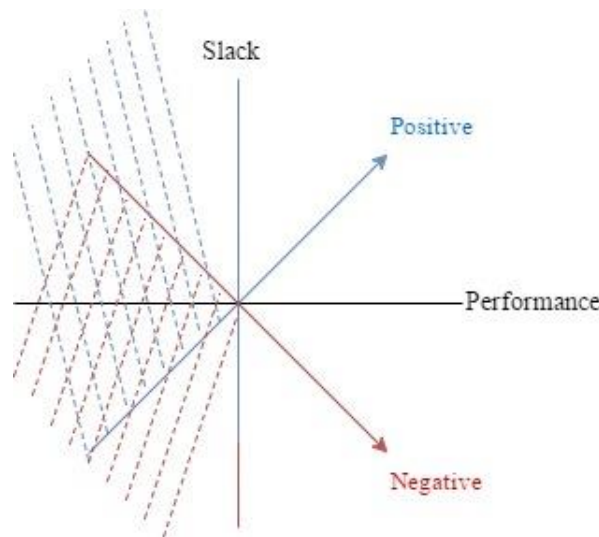
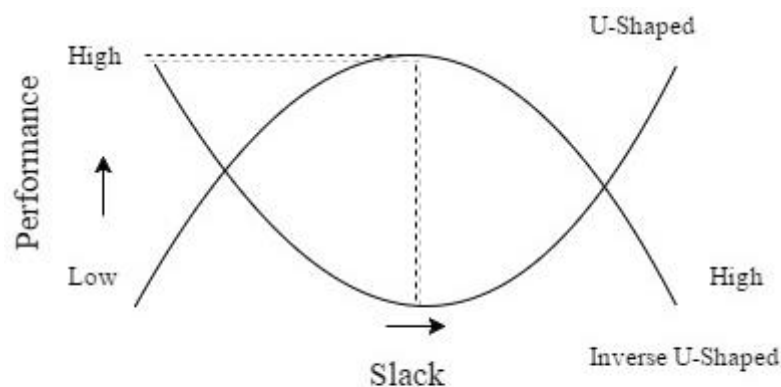


Figure 2-6 – Linear (Positive and Negative) Relationship



The U-Shaped and inverse U-Shaped curvilinear relationship between slack and performance.

Figure 2-7 - Curvilinear Relationships

#### 2.1.2.1.8. Non-Traditional Views

Neither of the theoretical approaches alone offered, thus far, has evaluated how firms manage their slack resources when facing sudden environmental changes in strategic management literature (Meyer, 1982, Meyer et al., 1990, Venkataraman, 1998, Wan and Yiu, 2009, Andersen, 2013, Makkonen et al., 2014, Meier et al., 2013, Reinhart and Rogoff, 2011, Tan and See, 2004). As mentioned before, one of the indicators of the main characteristics of financial crisis is leading to massive uncertainty.

The optimum level of slack can be expected to achieve desired firm performance when environmental munificence decrease and dynamism increases (Chen, 2015b, Goll and Rasheed, 2004, Park and Mezias, 2005). The following section therefore aims to detail the un-traditional views of slack-performance relationship, predictions and the theoretical research on this relationship.

The concept of slack and its association with firm performance can be examined under the title of three different perspectives: (1) Level of Slack – (Less vs. Much) – Perspective, (2) Perception of Slack – (Good vs. Bad) – Perspective, and finally (3) Risk of Slack - (Risk-Averse vs. Risk-Seeking) – Perspective. The extant literature was used to explain these three dual perspectives and varying definitions. As a consequence, slack-performance relationship was discussed in terms of these three main arguments.

Figure 2.8 illustrates the relationship between these six theories and classification of them based on slack-performance relationship.



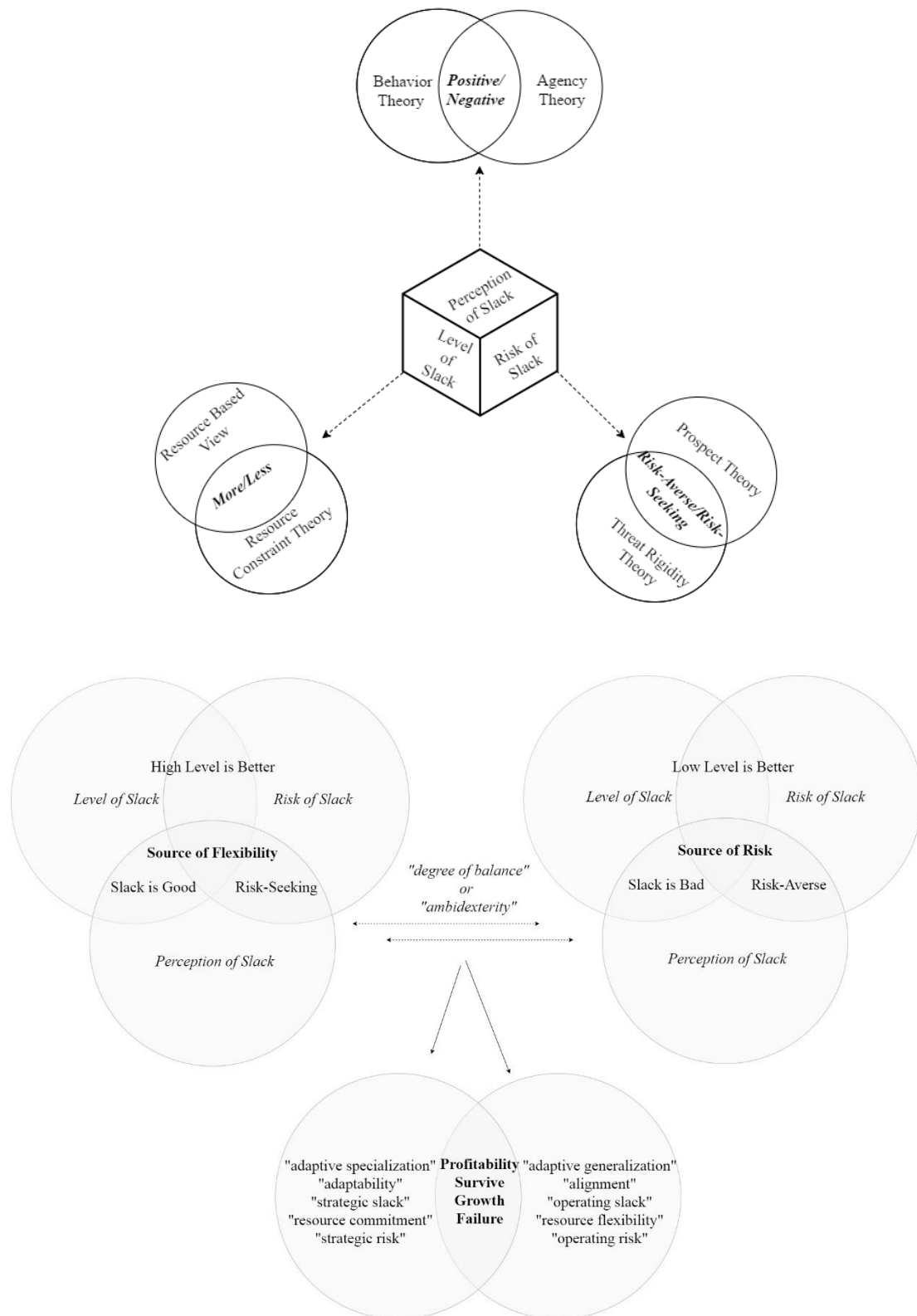


Figure 2-8 - Classification of theories based on slack-performance relationship

#### 2.1.2.1.8.1. Level of Slack – (Less vs. Much) - Perspective

A wide range of slack resources provides insights into what organizational characteristics are most conducive to improving firm performance (Chen and Huang, 2010, Gral, 2013, Jalilvand and Kim, 2013, Marlin and Geiger, 2015a, Mizutani and Nakamura, 2014, Orlando et al., 2016). The perspective of ‘level of slack’ indicates two types of organizational characteristics. However, the relative influence of each characteristic, is in turn, affected by the level of slack resources.

Although the above traditional perspectives are helpful in understanding slack-performance relationship, it is also important to consider how unique organizational characteristics depend on the level of slack. To fill this research gap, a ‘level of slack’ perspective was discussed, which is critical to consider in designing and assessing slack management.

RBV and RCT are two arguments that help to explain this research phenomenon. In this context, whether less or more slack is essential for organizational characteristics or whether scarcity or abundance of organizational slack is essential to achieve superior firm performance is one of the topics attracting significant attention in management literature (Bradley et al., 2011b).

The resource-based view suggests heterogeneous clustering resource and indicates the importance of slack form and significance of amount of slack resources (Mosakowski, 2002, Penrose, 1959). Peteraf and Barney (2003) proposed that possessing more valuable resources leads to better firm performance when compared to firms without valuable resources.

However, RCT suggests that organizations have ‘a pool of valuable resources’ that creates resource synergy. Increasing level of this ‘resource pool’ by adding more resources will destroy such synergy (Mosakowski, 2002) and thus damage firm competitive advantage. Scarce resources enable firms to manoeuvre their strategic options efficiently (Baker and Nelson, 2005).

As illustrated in figure 2.9, RCT suggests that less resource can create more synergy, more efficiency and thus more performance (Dolmans et al., 2014, Luo et al., 2013). This may sometimes be related to the uniqueness of resource. Unique resources can make more significant contribution in some cases. RBV and RCT are two opposite approaches on ‘a process of possible resource position’ (Vanacker et al., 2016).

According to RBV, firms begin to stock slack resources when they available accumulates more than necessary for the daily tasks at the end of this process. On the other hand, RCT points out that constraints occur ‘when fewer resources are available than necessary’ (Vanacker, Collewaert et al. 2016). Empirically, past studies mostly considers this process as one dimensional in nature based on particular form of slack, characteristically financial resources (George, 2005).

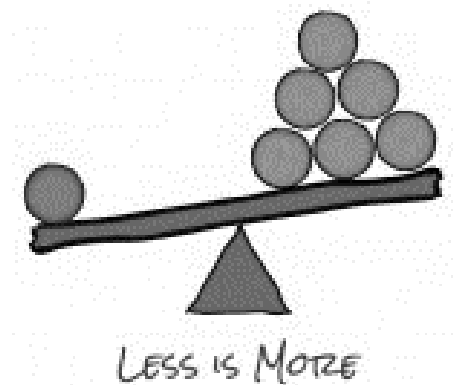


Figure 2-9 –Less is more

#### 2.1.2.1.8.2. Perception of Slack- (Good vs. Bad) - Perspective

Because of the environmental factors, managers' perceptions can be varied regarding slack development. Some scholar suggests that environmental conditions determine the level and form of slack when firms face difficulties<sup>76</sup>. For example, environmental munificence provides positive perceptions for managers<sup>77</sup> and stimulates accumulating slack resources (Sharfman et al., 1988, Gral, 2013, Bradley, 2007). Because, the environment is stable and resources are rich in the environment (Chen, 2015b, Tilcsik, 2014).

However, if the environment is dynamic and resources are scarce, then managers will consider controlling resource allocation (Chen, 2015b, Goll and Rasheed, 2004, Ricciardi et al., 2016, Schilke, 2014). They will exercise slack generation cautiously.

Additionally, organizational slack and performance relationship may vary depending on environmental conditions (Daniel et al., 2004, Latham and Braun, 2008). In general, previous studies focused on contingency factors for the environment to measure the slack-performance relationship (Latham and Braun, 2008, Vanacker et al., 2016, Jifri et al., 2016).

The perceptions of slack covers environmental conditions and their implications on slack-performance relationship. In terms of good and bad arguments regarding slack and performance relationship, BTF introduces evidences on “slack is good” argument that slack allows for a buffer for unexpected pressures and facilitates proactive strategies (Soetanto and Jack, 2016a).

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<sup>76</sup> Some relevant references are (Bradley et al., 2011a, Cheng and Kesner, 1997, Lengnick and Beck, 2005, Martínez et al., 2014, Meyer, 1982, Venkataraman, 1998, Wan and Yiu, 2009).

<sup>77</sup> Inherently, managers will think that to a certain extent excess resources are necessary for firms' growth and profitability (Cheng and Lin, 2012, Liu and Jin, 2015, Lee and Wu, 2015, Tan and Peng, 2003).

Slack resources help firms to create a buffer against unexpected environmental conditions<sup>78</sup> and to successfully manoeuvre firm strategies in order to re-align or re-fit to new environmental demands that already changed<sup>79</sup>. These environmental factors have some implications on slack-performance relationship in the event of environmental jolt<sup>80</sup> (Meyer, 1982, Wan and Yiu, 2009).

Therefore, it is important to refine and extend the study of organizational slack for the different environmental conditions, especially in the context of before, during and after financial crisis. The stream of *organizational theory* supports, therefore, the argument of “slack is good for firm performance or source of flexibility” (Moses, 1992, Zona, 2012, Bradley, 2007, Bradley et al., 2011b, George, 2005).

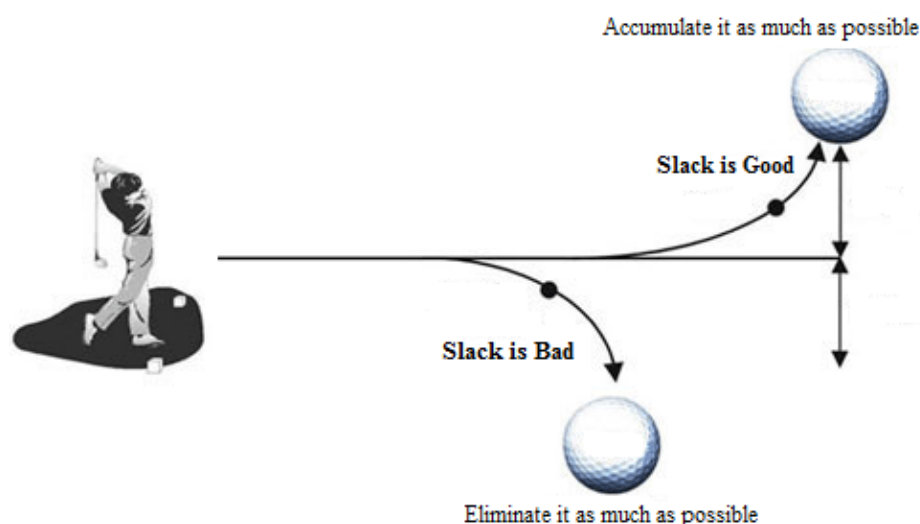


Figure 2-10 – Perception of slack

<sup>78</sup> This research stream suggests that slack plays a crucial role when companies face organizational uncertainty and internal conflict (Anderson and Tushman, 2001, Jifri et al., 2016, Koberg, 1987). It also helps firms to reduce coordination costs and information processing costs (Voss et al., 2008, Daniel et al., 2004, Levinthal and Marino, 2015)

<sup>79</sup> Some relevant references are (Chen and Chuang, 2009, Corsaro and Snehota, 2011, Knoll and Jarvenpaa, 1994, Tosti and Jackson, 1994, Álvarez et al., 2007, Bourgeois, 1981, Geiger and Makri, 2006, Geoffrey and Nohria, 2005, George, 2005).

<sup>80</sup> As alluded to earlier, different slack resources have different implications on performance outcome through their resource allocating strategies (Busenitz and Barney, 1997). Further, slack enables firms with flexibility to overcome sufficiently the firm commitments and to navigate the strategic options against environmental changes (Levinthal, 1997, Jifri et al., 2016).

Agency theory suggests that organizational slack may influence firm performance negatively and greater levels of excess resources lower firm performance<sup>81</sup> (Marlin and Geiger, 2015b, Stan et al., 2014, Ashwin et al., 2016). When the level of slacks is at its highest, then it may lead to inefficiency in firm operations and reductions on innovative and risky projects (Christensen et al., 2016, Bourgeois, 1981, Singh, 1986). Therefore, very large or lesser amounts of slack may increase firm performance or reduce firm investments, increase inefficiencies and consequently reduce firm performance<sup>82</sup> (Kuusela et al., 2016, Vanacker et al., 2016). This relationship was illustrated in figure 2.10.

Bourgeois and Singh (1983) therefore proposed that slack-performance relationship is inverted U-shaped or curvilinear (Kim et al., 2008, Mellahi and Wilkinson, 2010). However, if managers have a negative perception on accumulating excess resources or consider it as a source of risk, firms, then, begin to reduce levels of slack resources by means of reinvesting<sup>83</sup>.

Hence, during an environmental jolt, excess resources will play a significant role on firm investment preferences (Meyer, 1982, Meyer et al., 1990, Venkataraman, 1998, Wan and Yiu, 2009). In the face of volatile and unpredictable environment, slack may neutralize assorted disadvantages associated with risky investments or increase inefficiency in the organization. Consequently, perceptions of managers has a crucial role to determine level of slack resources.

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<sup>81</sup> As discussed earlier, excess resources in the organization are considered as agency problems, which leads to organizational incompetence, hinders taking risky initiatives and damages firm performance (Shaikh and Peters, 2014, Ashwin et al., 2016). Agency theory also indicates that slack has negative effects on investment preferences (Reilly et al., 2016).

<sup>82</sup> This is more likely to affect real investment options of firms to improve the adaptability to uncertain future and improve the response capacity (Chakravarthy and Lorange, 1984, Ford et al., 2002, Klingebiel and Adner, 2015, Sanchez, 1993, Tong et al., 2008, Trigeorgis, 1996). Thus, firms become open in terms of long-term improvements in performance.

<sup>83</sup> Some relevant references are (Barney, 1991, Bradley, 2007, Carnes et al., 2016, Cheng and Kesner, 1997, Cheng and Lin, 2012, Greenley and Oktemgil, 1998, Koberg, 1987).

#### 2.1.2.1.8.3. Risk of Slack - (Risk-Averse vs. Risk-Seeking) - Perspective

It is commonly agreed that taking risky initiatives is an indispensable procedure for organizations. Researchers have employed two opposite approaches<sup>84</sup> towards risk-related attitudes (Shimizu, 2007, Tsai and Luan, 2016). The first approach evokes prospect theory (PT), which suggests that an organization should adopt a positive attitude in risk-seeking when it is below the expectation of reference point (Singh, 1986, Wiseman and Gomez-Mejia, 1998, Shimizu, 2007). Additionally, such particular risk-seeking behaviour can be affected by adoption of performance level of performance aspiration. However, the second approach evokes the threat-rigidity theory (TRT) (Meschi and Métais, 2015), which argues that firms adopt a negative attitude conservatively under the threat situations (D'Aveni, 1989a, D'Aveni, 1989b, Meschi and Métais, 2015).

It is generally agreed that firms will restrict control under a turbulent environment (Makkonen et al., 2014, Meier et al., 2013, Tan and See, 2004, Zheng and Yanjun, 2010). Therefore, these two opposite approaches consider alternative adaptation strategies concerning experiencing threat of uncertainty. In addition, current literatures provide empirical support sufficiently for both theories (Meschi and Métais, 2015, Fiegenbaum and Thomas, 1988).

Moreover, proposing the perception of reference points, several earlier studies offered and identified the relationship between risks, references and threats (Shimizu, 2007, Tsai and Luan, 2016). According to them, because of managers limiting the level of required resource available, flexibility of organizations decrease, they become rigid by applying only vital and critically verified resource stocks, and engage in centralized decision-making when faced with threat (above the reference point).

Conversely, managers encountering an opportunity (below the reference point) can be expected to have more flexible, to be investment-oriented, and to use firm resources and to decentralize decision-making. This situation was illustrated in Figure 2.11. Although reference point can be considered as an integrative point of both theories, there are many distinct points in between prospect and threat rigidity theories. Threat rigidity approach identifies threat as hostile environmental conditions a firm experiences whereas reference point is considered threat as new issue (above reference point) indicating an organization is contending with existing conditions.

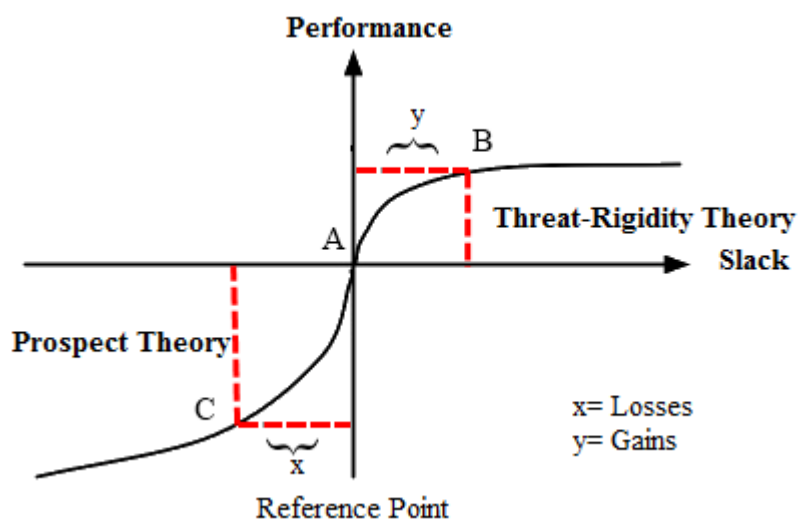


Figure 2-11 - Losses and Gains

On the other hand, prospect theory coped with the relationship between risk behaviour and the existing firm situation relative to a reference point (Tsai and Luan, 2016, Shimizu, 2007, Hambrick, 2003, Kahneman and Tversky, 1979). However, the threat rigidity perspective suggests the inability of firms to deal with a hostile environment (Zona, 2012). Hence, while prospect theory correlates with loss, threat rigidity approach correlates with excessive challenge and uncertainty (Ocasio, 1995).



The internal resource stocks impact abilities of organizations to recognize changed environmental demands as risk or opportunity and, thus, affect the adaptation process (Greenley and Oktemgil, 1998, Chakravarthy, 1986, Chakravarthy, 1982).

#### 2.1.2.1.8.4. The Relationship between Theories and Theoretical Framework

Rather than using a single theory due to its limitations, in consistent with Shimizu (2007) and Miller and Tsang (2011), this thesis prefers to combine several theories, including RBV, RCT, BTF, AT, PT and TRT in order to explain the nature of slack-performance within the context of financial crisis.

The scope of a multi-theoretical perspective (Yu, 2017, Bauweraerts and Colot, 2017) may serve as an instrument to explain slack-performance relationship that is applicable to the diverse environmental conditions. In addition, a single theory may not work well in explaining this relationship in the context of financial crisis (Bromiley et al., 2017). Integrating different theoretical perspectives together to explore the impact of slack resources on firm performance can be more powerful than using a single theory (Vanacker et al., 2016, Duckjung and Alison, 2017). While some studies of organizational slack started out by employing a single theory, the use of multi-theoretical perspective seems to have become more common in management literature (Eisenhardt and Graebner, 2007). There is no single theory predominates in explaining results at the organizational-level (Shimizu, 2007).

Table 2-5 -Main Differences and Similarities between Theories

Theories	The key idea on Resource Endowment	Performance Outcomes	Slack Resources	Main Studies	Perspectives	Concerns prediction of	Addresses
Resource Based View	Resource Maximization	Growth	Firms require surplus resources to grow, they have an incentive to use these resources productively.	(Penrose, 1959)	Much	Organization	Past/current performance
Resource Constraint Theory	Resource Synergy	Synergy (Efficiency)	Firms with fewer resources are likely to utilize their resources more efficiently	(Baker and Nelson, 2005; Chiu and Liaw, 2009)	Less	Organization	Past/current performance
Behavioural Theory	Resource Availability	Adaptation	Slack fulfils both a stabilizing and adaptive role by absorbing environmental variability.	(Cyert and March, 1963; Palmer and Wiseman, 1999; Wiseman and Bromiley, 1996; Shimizu, 2008)	Good	Organization	Past/current performance
Agency Theory	Resource Minimization	Organizational Continuity	Minimum level of slack required for organizational continuity	(Jensen, 1986)	Bad	Organization	Past/current performance
Prospect Theory	Resource Availability	Risk-Taking	Firm's performance positively interacts with slack resources available within the organization, to determine the actual levels of investments in risky projects.	(Kahneman and Tversky, 1979 ; Shimizu, 2008; Zona, 2012)	Risk-Seeking	Individual	Future/current performance
Threat Rigidity Theory	Resource Conservation	Risk-Averse (Efficiency)	Organizations are likely to emphasize efficiency and cost cutting to conserve diminishing resources	(D'Aveni, 1989; Staw et al., 1981; Shimizu, 2008)	Risk-Avoid	Individual, group, and organization	Past/current performance

Drawing from six different theories, three different perspectives regarding slack-performance relationship were developed in this study as key determinants for influence of slack resources on firm performance. Slack – performance relationship was evaluated at organizational level and thus investigated from different perspectives including *amount* (Mousa and Reed, 2013, Wang et al., 2016b), *perception* (Tan and Peng, 2003, George, 2005, Martin et al., 2015) and *risk* (Shimizu, 2007, Kuusela et al., 2016).

The usage of these three terms (amount, perception and risk) suggest rather different dimensions of slack-performance relationship. Although these perspectives are not related to each other, these three perspectives should be examined together because they offer alternative predictions about why and how slack resources may impact the magnitude of performance change. In addition, environmental changes can lead to accumulation and decumulation of slack in organization (Paeleman and Vanacker, 2015, Liu et al., 2014). Firms adjust their resources depends on degree of environmental changes (Trahms et al., 2013). Therefore, environmental changes also affects organizational adaptation depends on changes in resources (Lungeanu et al., 2015, Kuusela et al., 2016).

Furthermore, reduction or creation in slack based on magnitude of environmental changes can influence current and future risk-taking behaviours (Wang et al., 2016b). Hence, these three perspective should be examined by managers in order to deal with environmental changes. The table 2.5 illustrates related theories in context of these three different perspectives that firms pursue in allocating and deploying slack resources and highlight the main similarities and differences for slack-performance relationship.

Firstly, the amount of slack is one of the key driver that influence magnitude of performance change. As Mousa et al. (2013) pointed out, the amount of slack resources can be a determinant for adjusting firm performance. They also asserted that level of slack can influence to maintain day-to-day operations as well as taking risky initiatives for future investments (Marlin and Geiger, 2015b, Dutta et al., 2016). The relative amount of slack resources has been used as an indicator of resource maximization and resource synergy in the past studies (Alexy et al., 2017). RBV and RCT, thus, argue the importance of amount of slack resources. While RBV suggests that much slack or resource maximization leads to firm growth (Verbeke and Yuan, 2013), RCT asserts that less slack or resource synergy helps firms to have resource efficiency (Vanacker et al., 2013). Therefore, these two theory influence firm performance from the perspective of level of slack in organizational-level.

Secondly however, studies of behaviour theory (Lungeanu et al., 2015) and agency theory (Martin et al., 2015) suggest importance of managerial perceptions and discuss perception of managers on idea of "*slack is good or bad for organization*". The key idea of BT on resource endowment suggests resource availability as well as organizational adaptation. Cyert and March (1968:38) suggest that "*slack fulfils both a stabilizing and adaptive role by absorbing environmental variability*". On the other hand, consistent with this approach, agency theory suggests that misuse of excess resources can lead to inefficiency and consequently may cause maladaptation to changing environment (Marlin and Geiger, 2015b) . AT also argues that minimum level of slack is necessary for firms because of organizational continuity (Stan et al., 2014). Therefore, second perspective is related to how managers perceive slack resources (e.g., as slack is good or bad) and how they allocate these resources in sake of organizational adaptation.

Thirdly, on the other hand, the presence or absence of slack resources may influence firms' risk-taking behaviours (Patel and Chrisman, 2014, Lecuona and Reitzig, 2014). Therefore, slack can be seen as a behavioural source of risk preferences (Shimizu, 2007). Prospect theory suggests resource-availability and argues that more slack resources increase risk-taking (Carnes et al., 2013, Martinez and Artz, 2006).

However, threat rigidity theory suggests that rigid organizations cannot be innovative and take risky initiatives due to possessing too much resources (Patel and Chrisman, 2014, Greve, 2011). Thus, TRT suggests resources conservation and efficiency (Lungeanu et al., 2015). These two theories are different from BTF because both PT and TRT were drawn mainly from psychology. (Shimizu, 2007). However, BTF was drawn from economics (Alessandri and Pattit, 2014).

On the other hand, the relationship between slack and risk-taking behaviours is curvilinear rather than linear. This is because too much excess resources is associated with inefficiency and consequently associated with less risk-taking behaviours (Filatotchev and Nakajima, 2014). In addition to previous two perspective, therefore, opposite arguments on slack-performance relationship, where either slack provide increased risk taking behaviours or leads to risk-seeking, is also essential and should be investigated from the perspectives of risk-taking behaviours.

Complementing these three perspectives drawn from six theories at an organizational-level is important for three reasons. First, these perspectives cope with different degrees of performance outcomes (see table 2.5). Combining the outcomes from these three perspectives will provide a comprehensive picture of slack management with varying performance implications. Second, slack management is an important factor for managers to understand level and form of slack promote or inhibit adaptive changes (Wang et al., 2016b) and risk-taking (Oppen et al., 2016).

The financial crisis is the main criteria for designing the firm resources (Makkonen et al., 2014), which provides varying adaptation profiles and risk-taking behaviours to environment. Therefore, organizational behaviours for resources endowment may differentiate and shape due to environmental changes (Wilson and Amine, 2009). Combining these three perspective also provide a broader perspective to examine how firms adjust their resources in response to environmental changes.

Third, RBV, RCT BTF and AT concerns predictions of organizational behaviours for past/current; prospect theory, individual behaviours for current/future; and threat rigidity theory, individual, group and organizational for past/current reactions and performance (Shimizu, 2007). By integrating these approaches, outcome of organizational decision-making on slack management can be described in a better way (see figure 2.5).

### 2.1.3. Slack Management

Three factors are prominent (Sharfman et al., 1988) in the management literature regarding slack management; the first is that organizational characteristics must be evident for the decision-makers and applicable with future reference. The firms' resource capabilities provide firms different degrees of adaptability in an effort to avoid from internal and external burdens.

Second, slack can be a managerial discretion continuum distinguishing between strategic risky initiatives for future prosperity (or survival) and operating risks for daily firm routines. Third, slack is a potentially functional resource that can be easily redeployed to absorb unexpected threats come from environment (Bourgeois, 1980, Chakravarthy, 1982, George, 2005).

In the next section, two internal and one external phenomena will be elaborated, organizational characteristics, risk-taking behaviours, and environment, which the research will try to intersect in this study. This serves the purpose of providing views on these phenomena as applied in this paper.

#### 2.1.3.1. *Organizational Characteristics (Internal)*

It is important for firms to balance considerations for “flexibility” and “commitment” in terms of resources. A firm’s choice of different employment of strategy depends on the uniqueness and level of firm resources (Singal and Jain, 2016, Vanacker et al., 2016, Wang et al., 2016b, Wilson and Amine, 2009). Organizational development often correlates with a *commitment* to firm-specific resources; and abundance of resources is associated with *flexibility* for the firm (Kulkarni and Ramamoorthy, 2005).

The *flexibility/commitment* decision has significant implications on firm performance, especially in an environmental turbulence (Li and Li, 2010, Ruiz, 2006). RBV (Penrose, 1959) points out the importance of firms' resources in value creation (Barney, 1991). Resources are therefore considered valuable if they provide opportunities to seize or neutralize threats in the environment (Nason and Wiklund, 2015, Russo and Fouts, 1997, Newbert, 2008, Bradley, 2007, Bradley et al., 2011a).

Several studies have argued that firms should choose one or combination of these decisions, depending on the degree to which deployment and allocation skills contribute to adaptation to an environment with fundamental changes (Kraatz, 1998, Zajac et al., 2000, Boeker and Goodstein, 1991, Tushman and O'Reilly, 1996).

Firms are often indecisive with regard to uncertainty; 'whether they need to *commit* to a specific investment or stay *flexible*' through keeping holding excess resources (Kulkarni and Ramamoorthy, 2005). Such *flexibility versus commitment* bias predicts that a highly committed firm may have a competitive advantage and such commitment may provide a long-term *strategic* advantage for future survival and growth (Greenley and Oktemgil, 1998, Birkinshaw and Gibson, 2004). Nevertheless, the highly flexible (larger level of resources) firm is characterized by generic, less absorbed (or unabsorbed) resources (Bordoloi et al., 1999, Evans, 1991, Lee et al., 2009, Li and Li, 2010).

Thus, such *flexibility* may provide competitive advantage but in short-term and *operating* level for routine activities due to characteristics of 'slacks' that employed in various current operations (Chakravarthy, 1986, Chakravarthy, 1982, Dolmans et al., 2014). Therefore, a false move from decision of *resource-commitment* to decision of *resource-flexibility* in an uncertain environment may cost a loss of long-run competitive advantage for firms (Kulkarni and Ramamoorthy, 2005, Dolmans et al., 2014, Wilson and Amine, 2009).



However, it is possible for an organization to evade or pursue a trade-off between resource-commitment and resource-flexibility<sup>85</sup>. *Resource-flexibility* refers to resource availability and shows *operating* characteristics in slack management (Ma, 2014). It is frequent and it means slightly reversible resources (Daniel et al., 2004, Mizutani and Nakamura, 2014).

*Resource-flexibility* provides flexibility for managers and helps them to create various strategic options (Chang et al., 2013). *Resource-flexibility* mostly indicates that (1) the resources that may be used in a wide array of alternative uses; (2) the switching costs for alternative use are low; and (3) the required time to switch to an alternative use is minimal (Chipalkatti et al., 2013, Sanchez, 1995).

On the other hand, *resource-commitment* refers to resource-demand and shows investments related characteristics for *strategic* activities (Kulkarni and Ramamoorthy, 2005, Ruiz, 2006). It indicates a few clumpy decisions including fundamental shifts in resource endowments that are irreversible (Kulkarni and Ramamoorthy, 2005, Li and Li, 2010). *Resource-commitment* also shows usage of material and resources required, as well as support to achieve long-term survival (Li et al., 2016, Thongpapanl et al., 2012).

Additionally, *resource-commitment* offers a *strategic* way of improving long-run firm performance through enhancing *strategic* investment (Bowman and Hurry, 1993, Chrisman and Patel, 2012, Kim et al., 2008, Shaikh and Peters, 2014). Irreversibility on decisions to commit to a specific strategy may lead to persistent poorer or greater firm performance.

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<sup>85</sup> However, only a small number scholars (Kulkarni and Ramamoorthy, 2005, Ruiz, 2006, Brander and Spencer, 1992, Li and Li, 2010, Scholl, 1981, Pett and Wolff, 2003, Chang et al., 2014) operationalized excess resources based on firms' '*resource-commitment* and *resource-flexibility*'. In their view, slack was reviewed as a part of a continuum of managerial choice in the deployment of resources (Child, 1972, Argilés et al., 2016, Du et al., 2014, Huesch, 2013).

From the agency theory perspective, a *resource-commitment* can result in irreversible and substantially weaker firm performance (Jansen et al., 2006, Paeleman and Vanacker, 2015, Vanacker et al., 2016). Thus, excessive slack resources should eliminate from the organization. Investigation of the ‘sequences of events’ (Van de Ven, 1992, Kulkarni and Ramamoorthy, 2005, Selznick, 1957) can also enable firms to address why commitments can lead to persistent poorer or greater performance under the environmental changes (Meyer et al., 1990, Wan and Yiu, 2009).

From this perspective, there are two time-periods characterized as stable and unstable environments (Meyer, 1982, Meyer et al., 1990, Evans, 1991). However, stable periods are occasionally interrupted by sudden environmental changes, and the equilibrium is punctuated (Bednarek et al., 2016, Birkinshaw and Gupta, 2013, Karrer and Fleck, 2015, Venkatraman et al., 2007). Firms’ purpose is to manage excess resources, match internal and external environment by creating path dependencies during the course of ‘sequences of events’ before and after the punctuated equilibrium<sup>86</sup>.

Thus, punctuated equilibrium mostly results in irreversibility in strategy and commitment, and consequently, decisive poorer or greater firm performance when dealing with environmental uncertainty<sup>87</sup>. (Birkinshaw and Gupta, 2013). It is obvious from the earlier argument that ‘*alignment*’ between the ‘source’ of *flexibility/ commitment* and choice of firms to commit resources may lead to different performance outcomes.

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<sup>86</sup> Some relevant references are (Andriopoulos and Lewis, 2009, Josephson et al., 2015, Karrer and Fleck, 2015, Papachroni et al., 2015, Van de Ven, 1992).

<sup>87</sup> Uncertainty has also some significant implications on increasing *flexible alternatives* such as delaying options or investing in less specialized resources (Klingebiel and Adner, 2015, Adner and Levinthal, 2004). *Differing flexibility* in resources and alternative use provides better manoeuvrability when facing environmental challenges and thus allows for exploring and exploiting opportunities (Sanchez, 1995).

For example, there can be a lower performance if the *adaptation process* and slack management is not managed well and fail to achieve to re-gain alignment between internal and external environment. Firms can gather the different forms of slack and produce new applications in order to have competitive advantage (Barney, 1991, Teece, 2015). In this case, slack is essential to firms' future development.

In general, slack can be categorized into two forms: (1) strategic slack (commitment-based resources) and (2) operating slack (flexibility-based resources). Strategic slack resources are the physical and financial resources that are mainly prone to resource demand. They act as “invest in-slack-from-slack”. Such slacks are specific and well-defined resources (uniqueness). Similarly, operating slack resources are based on physical and financial resources but are mainly prone to resource flexibility (higher level of fungibility). They behave like “generate new slack-over-slack”.

The dichromatic idea and characteristics of strategic slack and operating slack show similarity with concept of ‘invested and generated slack’ (Chakravarthy, 1982, Chakravarthy, 1986, Greenley and Oktemgil, 1998, Bourgeois, 1981, Bromiley, 1991, Clark et al., 1994). Next section will discuss *resource capacities* in details.

#### 2.1.3.1.1. Resource Capabilities

##### 2.1.3.1.1.1. Slack and Resource Commitment

Resource-commitment can be defined as investments in R&D, physical resources (e.g., inventory or marketing expenses) and financial resources (e.g., working capital or dividend) (Kulkarni and Ramamoorthy, 2005, Ruiz, 2006, Neelankavil and Alaganar, 2003, Daugherty et al., 2005, Luo, 2004).

Resource commitment<sup>88</sup> that can be improved overtime could enhance firms' adaptability (Vega et al., 2008). Resource-commitment requires an adaptability process to provide application of investments in a changing environment (Autry et al., 2005, Luo, 2004, Petersen and Pedersen, 1999).

Therefore, adaptability is a crucial factor for choice of resource-commitment. Adaptability can be defined as a range of organizational capability that can be performed by firms to acquire, assimilate, transform and exploit slack resources to generate new resources (García et al., 2014, Ben and Greve, 2015, Todorova and Durisin, 2007, Malhotra et al., 2005, Gao et al., 2008).

There are two major functions of adaptability: (1) creating a temporal state of flexibility, demanding a certain level of flexible resources during the crisis by acquiring and assimilating slack resources (Wright and Snell, 1998, Golden and Powell, 2000, Lengnick and Beck, 2005) and then (2) applying new investments by transforming and exploiting existing slack resources in order to adapt to future environmental threats and new opportunities while gaining future enhancements in performance (Chakravarthy, 1982, Chakravarthy, 1986, Greenley and Oktemgil, 1998, Bourgeois, 1981, Bromiley, 1991, Clark et al., 1994).

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<sup>88</sup> Past studies also pointed out that resource-commitment can facilitate the “adaptive specialization” process (Chakravarthy, 1986, Chakravarthy, 1982, Chakravarthy, 1981) and thus enhance firm performance (Greenley and Oktemgil, 1998, Daellenbach et al., 1999, Rouse and Daellenbach, 1999).

Acquisition of slack indicates describing of slack that is essential to a firm's operations. Assimilation of slack refers to firms' operations that allow it for analysing, understanding and interpreting 'characteristic of slack' (Corsaro and Snehota, 2011, Karim et al., 2016, Knoll and Jarvenpaa, 1994, Powell, 1992). Transformation of slack means the ability to develop routines that enable combining current resources with fresh assimilated and acquired resources (Lengnick and Beck, 2005).

Firms can apply adaptability<sup>89</sup> through creation and development of operating slack resources (Chakravarthy, 1986, Chakravarthy, 1982, Greenley and Oktemgil, 1998). Past studies suggested that when firms invest more resources in strategic slack, the capability of effectively exploiting slack could be increased (Brynjolfsson and Hitt, 1996, Spithoven et al., 2011, Suzuki, 2016, Tyler and Caner, 2015).

Adaptability embedded in firm routines can be employed to recognise valuable resources through prior experience and actions (Zahra and George, 2002). Furthermore, the past investment in resources can regulate the superiority of its capability to assimilate, shape, and reconfigure its external and internal slack resources (Todorova and Durisin, 2007). Thus, firms' past investment in operating resources can positively influence its abilities to acquire, assimilate, transform, and exploit slack resources for future.

#### 2.1.3.1.1.2. Slack and Resource Flexibility

Firms need to improve their ability to reallocate their slack resource in turbulent environments (Amit and Schoemaker, 1993, Ansoff and Sullivan, 1993, Kraatz and Zajac, 2001). Flexibility can be explained as the '*adaptation capacity*' to enable better adjustment to changing conditions, rapidly and in relation to wide-ranging needs (Milliman et al., 1991, DeFeis, 2015, Kirkwood and Price, 2006, Stieglitz et al., 2015). Resource-flexibility enables firms to reconfigure their resources to accommodate the environmental change (Ma, 2014). This perspective can be also explained by Sanchez (1995)'s argument regarding switching cost for alternative uses, which was previously explained (Sanchez, 1995, Sanchez, 1997, Kraatz and Zajac, 2001, Lungeanu et al., 2015, Zajac et al., 2000).

Resource flexibility allow firms for protection against fluctuations in unexpected changes and fundamental environmental shifts (Saraf et al., 2007, Cheng and Kesner, 1997). As a result, resource flexibility provides firms to reconfigure their strategies to face environmental uncertainty (Wright and Snell, 1998, Milliman et al., 1991, Sanchez, 1997, Brozovic, 2016, Nandakumar et al., 2014, Breton and Miller, 2015). When firms achieving superior performance, they deploy their specific resources as well as their capabilities (Autry et al., 2005, Darnall and Edwards, 2006, Huesch, 2013).

The importance of resource-flexibility has been emphasized by several prior studies (Evans, 1991, Sanchez, 1995, Sanchez, 1997, Kraatz and Zajac, 2001, Ma, 2014). It is expected from an ideal flexible organization is to support its adaptation process with sufficient flexible resources during the environmental changes (Saraf et al., 2007). When environment changes, firms start to reconfigure their resources, keep them ready-to-use for existing capabilities that can acquire, assimilate, transform, and exploit resources by updating them for latest environmental conditions when need (Todorova and Durisin, 2007).

Minimizing the time needed switching slack with another alternative form, and reducing the switching cost from one use to alternative one through enhancing the sets of uses to which a resource can be employed, firms can increase the capacity of adaptation to meet the new environmental demand after uncertainty<sup>90</sup> (Sanchez, 1995).

It is important to note that differences in such slack management strategies<sup>91</sup> of firm may causally lead to differences in performance and competitive advantage of firm (Conner and Prahalad, 1996, Daugherty et al., 2005). Therefore, allocation of resources as required is important to achieve competitive advantage. However, it was also agreed with the view that excess resources should not only be measured with single financial ratios, but also some of the most important combined, or combination of slacks<sup>92</sup> that may have tremendous effect on firm performance (Chen and Miller, 2007, Tyler and Caner, 2015).

For this reason, firm may follow these two types of resource strategy to manage adaptation capabilities and, thus, yield improved performance as; (1) strategic slack and (2) operating slack. These two forms of deployable resources include homomorphic slack forms, were evaluated under the complex bundle forms in here, such as different forms of financial resources, physical resources, technological resources and managerial resources that are related to investment and efficiency. Such complex bundles of slack and related capabilities were exercised through adaptation processes that enable firms to co-ordinate firm operations and take advantage of firm resources in the turbulent environment.

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<sup>90</sup> As a result, firms can improve their resource-flexibility to increase firms' adaptation capacity for unexpected changes (Ambrosini and Bowman, 2009). Furthermore, these resource-flexibility and resource-commitment strategies can coexist either simultaneously or consecutively and often used together (Josephson et al., 2015, Zhang et al., 2016a, Goossen and Bazazzian, 2012).

<sup>91</sup> The availability of a higher level of excessive slack is however, considered source of inefficiency due to view with sceptical agency theorist who suggest that slack lead to managerial opportunism (Lungeanu et al., 2015, Vanacker et al., 2016, Jensen, 1986). For example, managers may use these excessive slack resources for their self-interest through value-destroying investments (D'Aveni, 1989b, Shaikh and Peters, 2014, Wiseman and Gomez-Mejia, 1998, Wu and Tu, 2007).

<sup>92</sup> (-i.e., some composite slack through standardizing and summing slack variables to form a composite slack index- See Wei-Ru Chen and Miller, 2007, Tyler and Caner, 2015)

#### 2.1.3.1.2. Adaptational Capacity

##### 2.1.3.1.2.1. The Process of Adaptation

The process of adaptation comprises two minor activities. Chakravarthy (1982, 1986) labelled these ‘*adaptive specialization*’ (*AS*) and ‘*adaptive generalizations*’ (*AG*). *AS* the means of enhancing the configuration of the organisation with its internal and external environments.

It is the progression (alignment) involved in boosting general orientation by using the actual environment to enhance short term performance reflected as generated slack.

*AG*, by contrast, is the method of putting these slack assets to best use for the betterment of adaptability to precarious and unexpected possible environments and specifically improve the response capacity to adapt to future environmental threats and new opportunities while gaining future increases in performance.

Therefore, *AS*’s the method of boosting the arrangement of the company with its current environments whereas *AG* is the process of improving the adaptability of the firm to its future uncertain environments. It has also been argued in the previous literature discussion that since both alignment and adaptability are continuous constructs, organisations can adopt different degrees of alignment and adaptability with varying performance differences.

The two components of organisational adaptation, namely alignment and adaptability, are briefly discussed next.



#### 2.1.3.1.2.2. The Organisational Alignment

In SM and OT literatures, the notion of arrangement (coterminous with ‘fit’) has been judged as configuring entities’ assets, products and services to environmental dangers and openings. ‘Organisational alignment’ describes notions in which assets, commodities and services and the exterior market merge to create a productive whole (Inamdar, 2012, Kaplan and Norton, 2006, Powell, 1992, Thongpapanl et al., 2012, Chakravarthy, 1986, Chakravarthy, 1982).

It is a measure of degree, ranging from complete opposition such as no or little alignment to perfect harmony and synergy in terms of perfect alignment. Organisational alignment requires organizations to demonstrate a high order of integrative capacity externally with their environments and internally with their resources and products/ services (Pérez et al., 2008), which is viewed as appreciated, but rare, organisational ability.

In this sense, configuring ability may, in the resource view lead to superior performance reflected as generated slack for the organization (Powell, 1992, Greenley and Oktemgil, 1996, Scherpereel, 2006). AS, as a process of alignment, seeks to minimise the misfit between the external and internal environment (i.e., firm’s resources and its products/ services) by fine tuning the competitive strategy pursued by the firm (Chakravarthy and Lorange, 1989).

These adaptations are needed as non-alignment suggests ineffectiveness, below standard performance and the possible demise of a firm (Bluedorn, 1993, Gersick, 1994, Burton et al., 2002). Inherent in most treatments of organisational alignment literature, is the starting point that entities are more productive and beneficial when they obtain good fit in relation to non-fit (or misalignment). (Dubey and Gunasekaran, 2016, Birkinshaw and Gupta, 2013, Gibson and Birkinshaw, 2004, Burton et al., 2002).

This suggests that firms differ in their level of alignment with their environments with the varying levels of operating slack resources. Highest level of operating slack occurs when the firm is perfectly aligned or adaptively fitted with its environment by balancing efficiency and effectiveness.

#### 2.1.3.1.2.3. The Organisational Adaptability

The literature survey on several definitions of (organisational) adaptability highlights various characteristics of the concept (Birkinshaw and Gibson, 2004, Dunlap et al., 2016, Goossen and Bazazzian, 2012, Kauppila, 2010). For instance, healthy adaptability may be explained as the capacity to spot and use market and technology openings, as well as, responding effectively to changing threats and situations (Nyhamar and Norheim, 2015).

Adaptability is also a requisite capability for changing market conditions since is defined as the organization's capacity to adapt itself quickly and efficiently to changed circumstances such as created by financial crisis or jolts (Malhotra et al., 2005). Few scholars also relate adaptability to real options literature, for example, DeNeufville et al. (2008) considers adaptability as the making available of future choices, without constraint to deploy these options. Findings indicates that adaptability is an asset that may be drawn upon at any time to stay ahead in the marketplace (Powell, 1992, Vorhies et al., 1999) and a superior level of firm performance (Bourgeois, 1980, Snow and Hrebiniak, 1980).

AS is the method for 'operating slack' (Chakravarthy, 1986, Chakravarthy, 1982, Chang, 1995, Moitra and Ganesh, 2005), while AG is the progression of putting these slack resources into the development of the company's adaptability to risky or unknowable environments. In order to understand adaptive generalization process let us consider a successful firm that is aligned with its current environment.

In such a situation, the firm generates slack resources depending on its level of alignment with its current environment : good alignment means higher levels of operating slack and poor alignment means lower levels of operating slack, where the highest level of slack occurring when the firm' internal and external environments are perfectly aligned.

Depending on its level of slack resources, a firm can invest these resources through 'adaptive generalization' process to prepare a range of future choices prior to their necessity so to improve its adaptability for future and uncertain environments<sup>93</sup> (Broersma et al., 2016, Junni et al., 2013, Ramachandran et al., 2014, Sollosy et al., 2015, Stettner and Lavie, 2014, Voss and Voss, 2013, Wassmer et al., 2016). The development of choices (options) via investment of slack has two good outcomes: the first is the actual value of the choices per se, the second is potential base in readiness for diverse alternatives (Evans, 1991, Sanchez, 1993).

These options then can be exercised during or after (future) crisis to improve the goodness of fit between inside and outside of organization (Trigeorgis, 1996, Trigeorgis and Reuer, 2016). Chakravarthy (1982, 1986) argues that both adaptive specialization (for improving *alignment* with the current environment) and adaptive generalization (for improving *adaptability* to future environments) need to be pursued *concurrently or simultaneously* as a continuous process for organizations to survive in the long term. Firms with such adaptation behaviour are basically acting in accord with the recommendations of organisational *ambidexterity* perspective of adaptation. Figure 2.12 illustrates this process between alignment, adaptability and ambidexterity.

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<sup>93</sup> In order to improve its future adaptability a firm may invest its slack resources in inventory, marketing, dividends, R&D or in working capital. Firms may invest their slack resources on paying dividends since numerous investors appreciate the fixed income linked to dividends, hence they may be more disposed to re-buy the same company's shares. Dividend disbursement is also viewed as a symbol of an entity's solidity and positive outlook, which again boost the future value of the firm (Deb et al., 2016); Reinhart and Rogoff, 2010). Investing slack on working capital gives sufficient liquidity to meet future obligations to buyers and suppliers. On the other hand investing slack on R&D help to develop future products for the markets. Investing slack resources on dividends, working capital and R&D pre-crisis may also provide variety of options, (i.e., growth, postponement, and abandonment options) (Smit, 2001, Bernardo and Ledoit, 2000, Adam and Goyal, 2008) which can be exercised to manage various different dimensions of during or aftermath of a crisis.

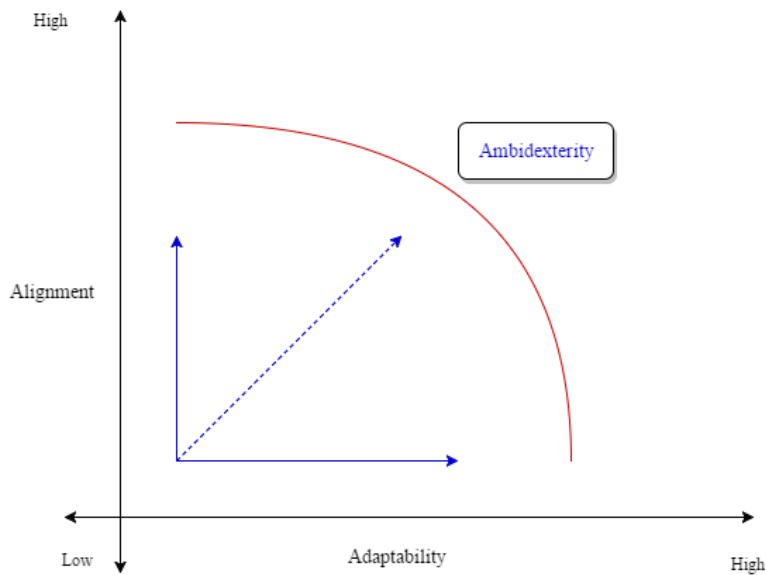


Figure 2-12- Alignment, adaptability and ambidexterity

#### 2.1.3.1.2.4. Flexibility, Alignment and Adaptability

Due to the difficulties in measuring firm performance, many earlier studies that have empirically linked organizational flexibility use slack resource variables (Fourné et al., 2016, Brinckmann et al., 2016, Gao et al., 2016, Chen, 2015b, Greenley and Oktemgil, 1998). Flexibility refers to temporal state, while adaptation refers to continuous respond of the firms to the environmental challenges (Wright and Snell, 1998, Bahrami and Evans, 2010, Brozovic, 2016, Evans, 1991).

Therefore, the assumption is if slacks are related to flexibility and affect firm's adaptation in a changing environment, then a superior firm performance must exist (Ruiz, 2006, Sanchez, 1995, Greenley and Oktemgil, 1998). Only relatively few studies directly address the explicit differences between the concepts of flexibility and adaptability in management literature (Greenley and Oktemgil, 1998, Bahrami and Evans, 2010, Evans, 1991, Dubey and Gunasekaran, 2016, Wright and Snell, 1998). Both approaches supporter the consideration of how requirements may change for the activities of current routines and future opportunities.

However, an environmental jolt provides firms an alternative to dispose of their slack resources (Lee et al., 2009, Reinhart and Rogoff, 2011, Wan and Yiu, 2009, Bradley et al., 2011b). Hence, the financial crisis context in which adaptability-flexibility trade-off is investigated may be specifically important. The view that an adaptable system may not be practical for all environmental conditions is also reflected in the scepticism of scholars with regard to whether a strategy can be adapted universally (Porter, 1990).

To understand this important dispute with practical and theoretical inferences, it is required to elaborate the adaptability-flexibility debate<sup>94</sup> to external environment such as ongoing financial crisis, particularly before, during and after context (Meyer, 1982, Meyer et al., 1990, Wan and Yiu, 2009). The flexibility does not only indicates organizational response to environmental turbulences, but also their capability to change and evolve overtime (Aaker and Mascarenhas, 1984, Bordoloi et al., 1999, Brozovic, 2016, Evans, 1991, Ford et al., 2002, Gao et al., 2016, Knoll and Jarvenpaa, 1994, Wright and Snell, 1998).

This “capacity to respond” is also referred to as adaptability (Volberda, 1996, Lukas, 1999, Patten et al., 2005, Reeves and Deimler, 2011). In this model, two factors were come into prominence: adaptability and flexibility. Adaptability was also identified as consolidating power-centre for changing routines (Goossen and Bazazzian, 2012, Tushman et al., 2010, Venkatraman et al., 2007, Voss and Voss, 2013). Mott (1972) classified adaptability to be both behaviour and symbolic.

In other word, it refers to “the strategy to change” and “the change itself”. Behavioural adaptation<sup>95</sup> refers to quick and prevalent acceptance of solutions (Wright and Snell, 1998). The process of alignment can be seen as a state which indicates a given point in time and an interface between internal and external environments(Venkatraman et al., 2007). Alignment can also be viewed as a snapshot because it copes with relationship between some ranges of dynamic contingent concepts.

In addition, these characteristics indicate commonly over-time rather than any point in time. A successfully adaptation in between old and new environmental conditions can be alleged for these characteristics. As illustrated in figure 2.13, thus, flexibility<sup>96</sup> can be described as the ability to achieve alignment by using process of adaptability under the circumstances of environmental changes. According to “complementary approach”<sup>97</sup>, both alignment and flexibility can exit at the same time.

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<sup>95</sup> On the other side, symbolic adaptation refers to perceiving and detecting problems in advance, developing reasonable timely solutions, and measuring up to firms that are seeking new technologies and methods to the firm activities (Miskel et al., 1979). The first of these approaches is "orthogonal approach" that suggested that flexibility and alignment are poles apart and they are complete opposite ends of same continuum (Davis et al., 2009, Wright and Snell, 1998). For instance, over-focus on exploiting alignment if a response to turbulent environment or organizational change is needed can be counterproductive (Lengnick and Beck, 2005). Therefore, achieving alignment is not always desirable. Even if there is no clear clue with regards to any negative relationship between flexibility and alignment, according to this approach, both construct cannot be exist simultaneously (Patel et al., 2013b). However, the second approach argues that each construct is independent from each other and therefore, refers to a “complementary perspective” (Chen and Chuang, 2009, Corsaro and Snehota, 2011, Tosti and Jackson, 1994, Bordoloi et al., 1999, Patten et al., 2005, Weigelt and Sarkar, 2012, Birkinshaw and Gupta, 2013, Broersma et al., 2016). Effectiveness shows to what extent the objective of the firm strategies have been achieved (Krishnan et al., 2016, Miskel et al., 1979, Shimizu and Hitt, 2004). When considering past studies, it is possible to categorize these differences in two key factors; 1) time frame and 2) goals of studies. When considered from point of time frame, “orthogonal approach” is concerned with at one point in time (it could be in any time period of crisis) (Bouzdine and Dupouët, 2009, Goossen and Bazazzian, 2012, Wright and Snell, 1998).

<sup>96</sup> For example, there is no guarantees of any same fit between any different point in time or time periods (Milliman et al., 1991). However, the notion of flexibility refers to an ability to respond as necessary in a dynamic environment (Sanchez, 1995). While alignment refers to internal and external balance or fit, flexibility refers to be purely internal in orientation (Kraatz and Zajac, 2001, Kraatz and Zajac, 1996, Zajac et al., 2000). Flexibility is associated with firm characteristics such as investment, finance and etc. that provide different types of adaptation to environmental changes (Chakravarthy, 1982).

<sup>97</sup> According to “orthogonal” approach, flexibility and alignment cannot exist simultaneously. Conversely, “complementary approach” argues that alignment refers to exploring adaptability process and seeking a longer time period. In the light of these facts, it can be said that while “complementary approach” refers to a prescription that explain “what a firm should do”, “orthogonal approach” addresses a description with regards to “what a firm

This goal may be efficiently achieved by employing alignment<sup>98</sup> which focuses on slack generation in a predictable and stable environment. It should not be forgotten that, under this circumstances, flexibility may become somewhat dysfunctional when alignment is achieved (Ansoff and Sullivan, 1993, Ma, 2014, Shen et al., 2014, Singal and Jain, 2016, Zajac et al., 2000). However, only way to achieve the alignment is to develop a flexible organization. Thus, it is expected that holding excess resources by firms must stimulate organizational flexibility in order to achieve alignment through *adaptability process*.

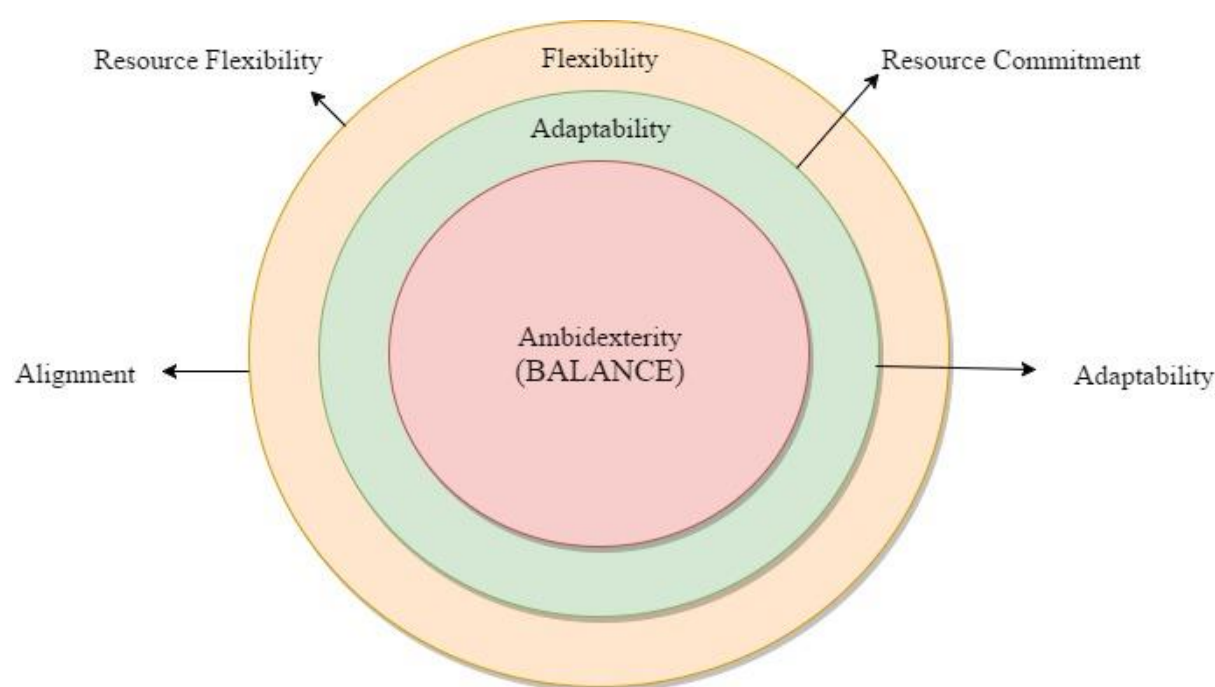


Figure 2-13 – Flexibility, alignment and adaptability

actually do”. This study has chosen the “complementary approach”. It does so, since flexibility and alignment concentrate on different dimensions of a firm, both constructs must be complementary.

<sup>98</sup> Apart from this, during the alignment process, it can be observed a state of flexibility and correspondingly adaptability can exist (Baard et al., 2014, Bahrami and Evans, 2010, Chakrabarti, 2015, Chakravarthy, 1982, Hutcheon, 2012, March, 2003, Sternad et al., 2011, Stieglitz et al., 2015). Concept of alignment and flexibility are completely independent from each other. Alignment does not symbolize inflexibility; likewise, misalignment does not mean flexibility. Flexibility refers to “a state of fit at any given point in time” (Hughes and Stephens, 2016). The key role of adaptation through organizational slack should be to stimulate an alignment under any circumstances in a changing environment.

#### 2.1.3.1.2.4. Overlaps between Ambidexterity, Adaptability and Flexibility

There are some overlaps between ambidexterity, adaptability and flexibility. The notion of ambidexterity is frequently used as a metaphor for trade-off between exploration and exploitation (Simsek, 2009, Bandeira et al., 2016). Studies have associated explorations with adaptability and flexibility (Ahearne et al., 2014, Weigelt and Sarkar, 2012), whereas exploitation has mostly been related to alignment and efficiency (Obloj and Zemsky, 2015). Empirical evidence about the attainment of adaptability and flexibility is inconclusive (Gopal et al., 2013).

Flexibility is always needed but adaptability is needed for survival (Evans, 1991, Hicks and Knies, 2015). Adaptability is an indicator of flexibility (Wright and Snell, 1998). As a result, adaptability refers to being flexible when environment changes (Matusik and Fitza, 2012, Lengnick and Beck, 2005). While flexibility implies creating an accurate response, adaptability implies transforming oneself (Bamel et al., 2015, Evans, 1991).

In theory, adaptability or ability to change routines was conceptualized by Mott (1972) and formulated a model for organizational effectiveness based on firm structure and closure-system which functions as a key moderating variable between organizational effectiveness and characteristics. However, the notion of flexibility refers to an ability to respond as necessary in a dynamic environment (Sanchez, 1995, Stieglitz et al., 2015).

While alignment refers to internal and external balance or fit, flexibility refers to be purely internal in orientation (Kraatz and Zajac, 1996, Zajac et al., 2000, Thomas and Ambrosini, 2015).



Flexibility is associated with firm characteristics such as investment, finance and etc. that provide different types of adaptation to environmental changes (Barrales et al., 2013). Apart from this, during the alignment process, it can be observed a state of flexibility and correspondingly adaptability can exist (Baard et al., 2014, Chakrabarti, 2015, Stieglitz et al., 2015).

Flexibility refers to “a state of fit at any given point in time” (Hughes and Stephens, 2016). The key role of adaptation through organizational slack should be to stimulate an alignment under any circumstances in a changing environment (Wang and Rafiq, 2014). Ambidexterity, on the other hand, is considered to be a necessary for superior firm performance, growth, prosperity and even survival (Junni et al., 2015, Borgh et al., 2015).

Consequently, related constructs such as adaptability and alignment utilized in this study aims to examine multiple factors contributing to the achievement of organizational ambidexterity because *"alignment and adaptability attributed to ambidexterity is a function of a culture that promotes flexibility"* (O'Reilly and Tushman, 2013). In collaboration with *organizational learning theory*, ambidexterity can be defined as simultaneous or sequential pursuit of exploitation and exploration (Patel et al., 2013b, Raisch et al., 2009, Swift, 2015).

Concept of adaptability can capture the distinct feature of flexibility, while concepts of both alignment and adaptability offer a dynamic learning cycle for ambidexterity (Weigelt and Sarkar, 2012, Wu and Wu, 2016). A dynamic learning cycle mostly happens in a situation of exploitation and exploration complement each other (Wang and Chugh, 2014). The balancing of having both exploitation and exploration often linked to flexibility-efficiency (Laureiro et al., 2015). Therefore, in the broadest sense a balance between both alignment and adaptability is on the theoretical grounds considered as ambidexterity.

#### 2.1.3.1.3. Resource Capability and Adaptation Capacity

Christenson (1973) argued an organizational characteristic perspective with regards slack resources. Slack refers to the excess of profit over the costs of activities that can be employed for future investment<sup>99</sup>. Slack can be created by enhancing technical and managerial capabilities (Miles and Cameron, 1982). Such capabilities can be created by obtaining new skills by means of allocating resources internally (Nadkarni and Chen, 2014, Lee et al., 2009, Oktemgil and Greenley, 1997, Teece and Leih, 2016, Zahra et al., 2006).

Firms that focus more on operating slack in pre-crisis period will have a better chance to deal with financial crisis and provide better adaptation capacity (Patel et al., 2013a). The method of improving organizational adaptation by managing the slack allocation process to increase firm performance has been ignored, and none of empirical studies has investigated slack - performance relationship through lens of organizational adaptation<sup>100</sup> (Cheng and Kesner, 1997, Baard et al., 2014, Chakrabarti, 2015).

Adaptive generalization refers to a process that enable firms to reinvest organizational net excess resources for enhancing its capability to adapt to ambiguous, high-velocity future environment (Bourgeois III and Eisenhardt, 1988, Eisenhardt, 1989b, McCarthy et al., 2010). In order to perform adaptation processes efficiently, firms should overcome two challenges – managing for fits and managing misfits (Chakravarthy, 1981, Chakravarthy, 1986, Chakravarthy, 1982).

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<sup>99</sup> Some relevant references are (Orlando et al., 2016, Shahzad et al., 2016, Suzuki, 2016, Vanacker et al., 2016, Wefald et al., 2010).

<sup>100</sup> Prior studies have suggested that firms modify their overall strategies in dealing with environmental uncertainty (Jifri et al., 2016, Koberg, 1987, Oriani and Sobrero, 2008, Teece and Leih, 2016, Volberda, 1996, Nadkarni and Narayanan, 2007). In fact, prosperous firms may think that they can safely disregard changes and challenges in the organization (Kiesler and Sproull, 1982) when faced with uncertainty (Venkataraman, 1998, Wan and Yiu, 2009). To deal effectively with environmental changes, firms should improve the adaptability of firms via adaptive generalization (Greenley and Oktemgil, 1998).

While adaptive generalization improves adaptive abilities by accumulating flexible resources in the organization, adaptive specialization commits those resources through adaptability process to achieve alignment with a greater level of adaptive fits (Kulkarni and Ramamoorthy, 2005, Li and Li, 2010, Petersen and Pedersen, 1999, Birkinshaw and Gibson, 2004, Sanchez, 1995).

Firms must improve their resource capability<sup>101</sup> (choice of flexibility/commitment) to manage fits better (Hong and Shin, 2016, Ford et al., 2002, Klingebiel and Adner, 2015, Oriani and Sobrero, 2008, Mizutani and Nakamura, 2014). Resource capability is a formation that includes blend of human resources and materials that influence strategic choices for achieving greater firm performance (Barney, 1991, Bradley, 2007, Kraatz and Zajac, 2001, Agarwal et al., 2009). When an organization increases its levels of adaptations, a greater reliance on rare resources occurs and increases more their dependence on those resources (Voss et al., 2008, Agarwal et al., 2009). Such a dependency increases the risk of failure relative if managers keep their adaptive abilities at the same level (Eisenhardt and Tabrizi, 1995, Lengnick and Beck, 2005, Ricciardi et al., 2016, Eisenhardt, 1989b).

Firms need to continue to invest in excess resources in enhancing, resource diversity, innovation level and human resource skills to avoid such risk. As illustrated in Table 2.4, four levels of organizational characteristics-resource arrangement, adaptive capacity and state of adaptation most appropriate- are suggested for reflecting level of adaptive profiles of firms. Once an organization increases its level of resource capability (especially resource flexibility), it also improves the level of its adaptive abilities, which enables it to create appropriate adaptation profile to increase its firm performance.

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<sup>101</sup> The resource capability (option or choice) indicates firms' resources- their assets and capabilities. The conjectural these options emerge from interaction of firms' current investments, their capacities, and environment.

Table 2.6 lists four level of resource arrangement and corresponding adaptation capacity and adaptation profile – Slack scarcity indicates limited adaptation capacity and unstable adaptation level. Operating slack focused and strategic slack focused have moderate adaptation capacity but in a stable state. Slack abundance implies ample adaptation capacity and a resilience state<sup>102</sup>.

Table 2-6 - Four Levels of Organizational Characteristics

<i>Resource Arrangement</i>	<i>Adaptation Capacity</i>	<i>State of adaptation most appropriate</i>	<i>Resources</i>	<i>Adaptation Profile</i>
Slack scarcity	Limited	Unstable	Low	Ambinistrious
Operating Slack Focused	Moderate	Stable	High	Alignment
Strategic Slack Focused	Moderate	Stable	Low	Adaptability
Slack Abundance	Ample	Resilience	High	Ambidextrous

Table 2.6 also provides two types of studies<sup>103</sup> for future research. The first one is to understand how firms invest in excess resources for *adaptive generalization*, and how they implement *adaptive specialization*. The second one is to scrutinize the performance-slack relationship, and the same relationship with environment and risk-taking as moderators. Table 2.5 summarizes above-mentioned relationship among *resource capability* and *adaptation capacity*. Similar to Chakravarty (1982), three forms of ‘adaptive fits’ are shown in figure 2.14: ‘stable fit’, ‘unstable fit’ and ‘resilience fit’. Stable fit represents two moderate conditions.

First, it is a balance condition that exists when an operating slack focused arrangement and *alignment profile* are paired. The organizations tries to protect themselves from the external effects by accumulating flexible resource as much as possible, as it is extremely susceptible to uncertainty and protective against sudden environmental changes. Second, it is a balance condition that exists when a strategic slack focused resource arrangement and an *adaptability profile* are paired.

<sup>102</sup> Chakravarty (1982) defined it as a neutral state.

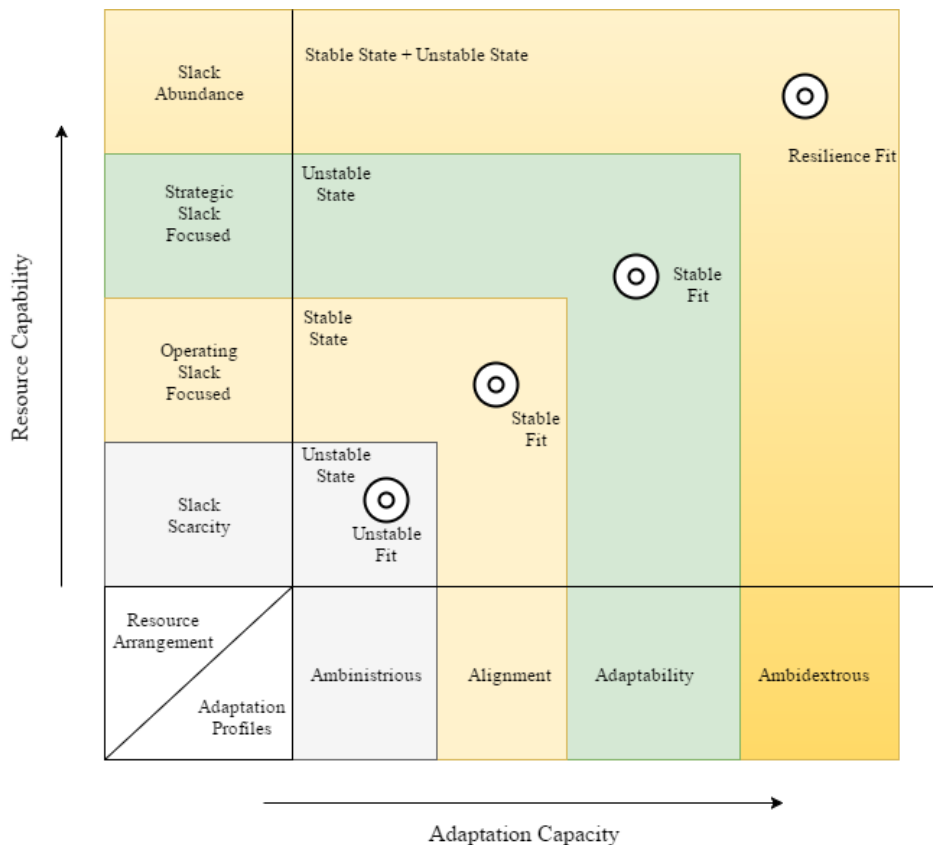
<sup>103</sup> Although it contains several conceptual arguments, this study specifically focuses on slack-performance relationship.

The organization possess adequate excess resources to respond environmental changes through making investment. However, given the nature of time-period and environmental conditions for firms, decision-making is often reactive. Unstable fit is the balance that exists when an *ambinistrrious profile* and a slack scarcity are paired. The organization tries to protect itself from the environment, but it fails due to lack of proper strategy.

Resilience fit is form of the highest equilibrium, where a pre-emptive, robust and resilience strategy (*ambidextrous profile*) and a slack abundance arrangement are matched. Table 2.7 demonstrates adaptation profiles and their corresponding advantages in general. It shows which firm resources correspond to which performance profile and their underlying adaptation process. For example, while ambidexterity indicates firm profitability, alignment-oriented strategy indicates firm growth. Adaptability-oriented profiles indicates future survival.

Table 2-7 - Adaptation profiles and their corresponding advantages

Profiles	Advantages					
	Survival	Growth	Profitability	Process alignment	Process adaptability	Competitive advantage
Ambidexterity			•	•	•	•
Adaptability Ori.	•				•	•
Alignment Ori.		•		•		•
Ambinistrrious						



Note: Inspired by Chakravarthy (1981)'s model.

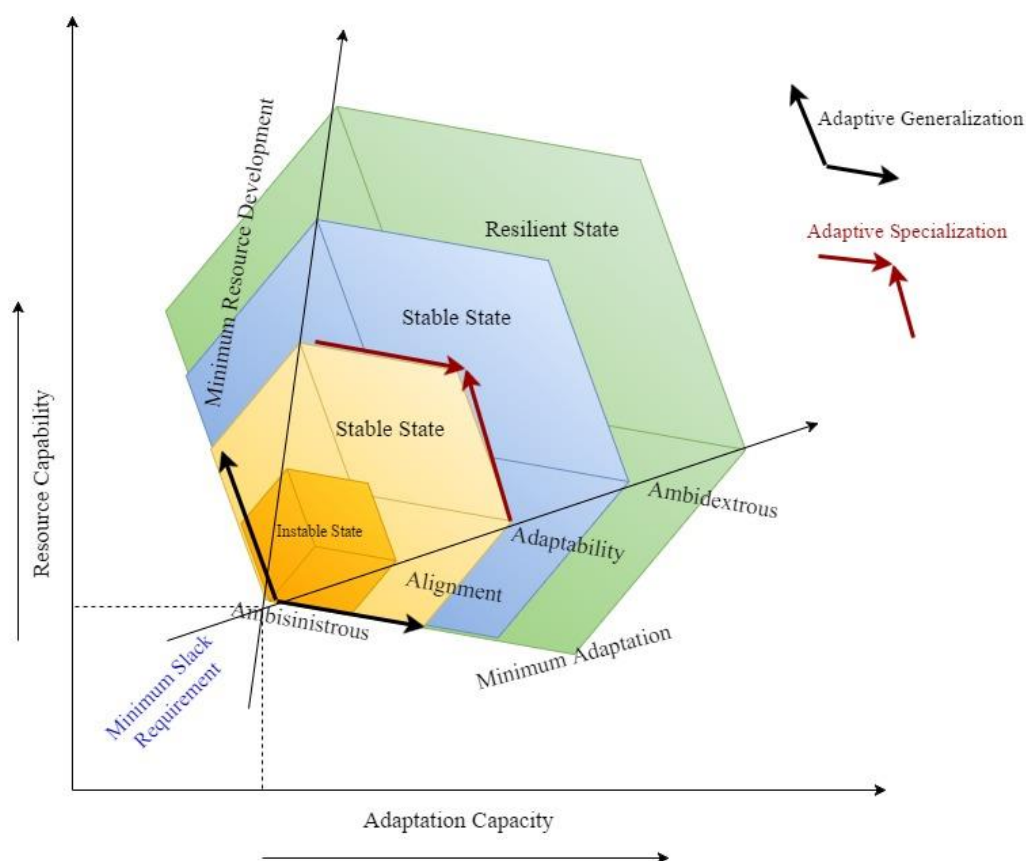
Figure 2-14 - Adaptation capacity and resource capability (stable or unstable fit) relationship

With regard to ambidextrous firms, they represent the best match of both resource capability and adaptation capacity for their decision-makers to pursue both exploration and exploitation activities simultaneously or concurrently. The organizational vulnerability to uncertainty is at the minimum level for them because decision-makers can anticipate most environmental changes before occurred.

However, Chakravarty (1982) pointed out that the *adaptive fits*, states of adaptation are two distinct constructs, and it is vital to discriminate them. A '*state of adaptation*' indicates growth, survival, profitability and failure, while an '*adaptive fit*' shows in addition the ideal utilization of the resource capability and firm adaptation capacity.

Adaptation capacity must do with strategic option of a goal appropriate to the external changes, and resource capability postulates that the ‘resource contribution’ generated by the firm in meeting its purpose are at least the same as or higher than the ‘inducement’ firm has to offer (Cyert and March, 1963).

An ambidextrous, adaptability-oriented, alignment-oriented or ambinistrrious do not need to be adaptively fitted. As illustrated in Figure 2.15, after firms accumulate minimum slack requirement for their daily routines, they begin to focus on one of *adaptation state* through providing minimum adaptation and resource development. Once firms archive optimum balance between adaptation capacity and resource capability, then it is assumed that they are adaptively fitted.



Note: Inspired by Chakravarthy (1981)'s original framework.

Figure 2-15 - Relationship between resource capability and adaptation capacity

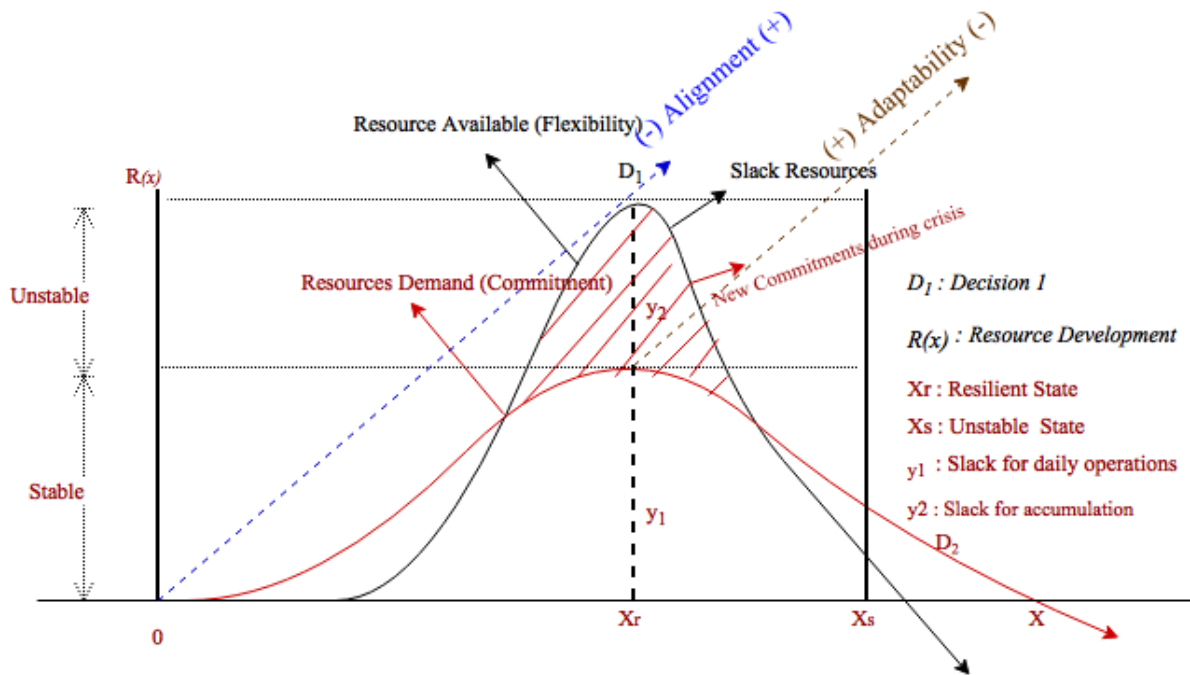


Figure 2-16 - Relationship between resource capability and adaptation capacity

For example, in the resilient state, one can conceive of an ambidextrous firm having higher resource capability or adaptation capacity, depending on the industry. In similar vein, adaptive fits indicate such balance. However, outside of each matched (states vs fits) can be repositioned by means of process of adaptation. In general, ambidextrous, alignment, adaptability and ambinistrrious firms are distinguished by the greatest fit that depends on level of excess resources.

Hence an ambinistrrious firm can be at best pursue unstable fit, an alignment-oriented firm a stable fit, an adaptability-oriented firm a stable fit, and an ambidextrous firm a resilience fit. Figure 2.15 also illustrates patterns of adaptive generalization and adaptive specialization between resource capability and adaptation capacity. Furthermore, figure 2.16 shows distribution of alignment and adaptability process in axes of adaptation state and resource capability (flexibility/commitment). The red area indicates difference between resource availability and resource demand.



As illustrated figure 2.15 and 2.16, transition of processes sometimes can be complex for firms. For example, these organizations may be misaligned temporarily with their environments (transition initially from stable to unstable and then to stable environment.). The nature of adaptation requires the exceeding of the border of misfits before achieving an adaptive fit. However, some firms may “*stuck in misfit condition*”.

Thus, these firms should be distinguished from others. For example, ambinistrrious firms pursue inconsistent and unstable strategies when responding to the environment. In general, they do not have a viable adaptation strategy and their strategies are no longer relevant to the current environmental requirements. An ambinistrrious firm therefore cannot adapt to its environment successfully.

#### 2.1.3.1.4. Resource Capability, Adaptation Capacity and Performance

Organizational theorists and BTF have suggested a possible relationship between adaptation capacity and slack resources. Firms with high level of adaptation capacity will have more excess resources than firms with low level of adaptation capacity (Chakravarthy, 1986, Cyert and March, 1963, Bourgeois, 1980), which implies ambidextrous firms exhibit more slack resources than mere adaptation profiles such as adaptability-oriented and alignment-oriented. Adaptation capacity provides strategic flexibility by means of slack deployment in the diverse environmental conditions (Sanchez, 1995, Wang and Ahmed, 2007). (Greenley and Oktemgil, 1997) pointed out that concept of slack and adaptation are complementary constructs. Viewing from this perspective, adaptation capacity should be positively related to level and form of slack (Chakravarthy, 1986, Bourgeois, 1980). From the RBV perspective, it is clear that purpose of resource capability is to improve adaptation capacity a firm possesses.

Resource capability building through choice of resource-flexibility and resource-commitment creates financial profitability if a firm is successfully at obtaining resources that can facilitate adaptation process increasing influence (Makadok, 2001). Managers who desire to enhance its adaptation capacity against potential environmental threats must accumulate slack resources and ensure 'adaptive generalization' for their firm (Chakravarthy, 1986).

Excess resources enable executive discretion to managers to use it on adaptation processes on long-term survival and performance. Slack has a significant role in proxying adaptation capacity and supports executive discretion. Available slack and absorbed slack are used to mediate relationship between performance and different factors such as innovation and risk-taking.

However, BTF suggests that resources arising from reduction in absorbed slack can be used for unabsorbed slack, and this ultimately increase firm performance. Organizational slack and adaptation capacity has been simply examined as distinct from each other in the literature, but none of the previous studies has investigated these two constructs (alignment and adaptability) together on the perspective of a slack-performance relationship.

#### *2.1.3.2. Risk-Taking Behaviours (Internal)*

The earlier arguments were clearly indicated that the degree of slack -performance relationship depends on resource allocations, risk-taking capabilities and environmental conditions. Therefore, after initially evaluating the slack -performance relationship in terms of organizational characteristics and environmental conditions, the relationship of performance and organizational slack must also be assessed from the point of risk-taking capabilities. It is commonly agreed that taking risky initiatives is an indispensable procedure for organizations.

In this regards, researchers have employed two opposite approaches of risk related attitudes. Prospect theory and threat rigidity theory are two opposite approaches were used as moderators that are believed that influence slack-performance relationship and interact with alternative adaptation strategies concerning experiencing threat of uncertainty. In addition, current literatures provide empirical support sufficiently for both theories (Shimizu, 2007, Schmitt and Raisch, 2013)

Threat rigidity approach identifies threat as hostile environmental conditions a firm experience whereas reference point is considered threat as new issue (above reference point) indicating an organization is contending with existing conditions. On the other hand, prospect theory copes with the relationship between risk behaviour and the existing firm situation relative to a reference point. However, the threat rigidity perspective suggests incapability of firms to deal with hostile environment. Hence, while prospect theory is correlated with loss, threat rigidity approach is correlated with unmanageableness and uncertainty (Ocasio, 1995). The internal resource stocks impact abilities of an organization to recognize new issues as risk or opportunity and, thus, affect the firm's adaptation process<sup>104</sup>.

#### 2.1.3.2.1. Slack and Risk-Taking Capabilities

The interaction of slack and risk-taking capability also attract many scholar's attention in several studies<sup>105</sup> (Bromiley, 1991, Sharfman et al., 1988, Shimizu, 2007). Therefore, this relationship was hypothesized to test that increases in slack are followed by riskier strategic decisions. Slack is surplus resources that provide efficient operation for firms (Bourgeois, 1981). Higher risk indicates higher uncertainty surrounding the future consequence of a current decision.

One of the contentions that influence slack-performance relationship is risk-taking capabilities that enable firms to interact with its external environment more broadly. Due to its effect on firm performance and managerial decision, risk is an indispensable component of management literature. Behavioural theory and agency theory also explain the risk-taking/avoiding choices of firms.

However, performance aspiration may not be as expected and level of performance aspiration can influence a firm's strategic choices. According to the behaviour theory, consistent with prospect theory, firms may prefer to use risky options when desired performance level below the performance aspiration in an effort to change existing firm attitudes leading to undesired performance shortfall (Cyert and March, 1963). On the contrary, for firms with above the level of performance aspiration, decision-makers reacts more risk-avoid-oriented to maintain exiting performance level.

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<sup>105</sup> Numerous previous studies pointed out the importance of risk-taking behaviours for firms by providing evidence of strong linkage between strategic choice (or option), risk-behaviour and firm performance. These results focus on several perspectives of firm risk at the firm-level.

Many studies have supported these arguments (Bromiley, 1991, Miller and Bromiley, 1990, Tsai and Luan, 2016, Tsai et al., 2008). These contentions propose that for low performing firms, one should expect risk-taking attitudes. In this case, firms will be more likely to change its adaptation strategies and move in the direction of risky actions that will differ from rivals' in order to enhance their performance.

Apart from this, potential external challenges and possible difficulties in generating slack resources will consequence in lower firm performance. On the contrary, firms with above reference point or level of performance aspiration will show risk-avoid attitudes, and therefore will less likely to be punished in terms of firm performance.

On the other hand, agency theory purposes another potential moderating effect. Firm managers tend to be risk-avoiding, while shareholders are risk-neutral. Yet, managers will tend to pursue shareholder interest necessarily because they have a stake in company and they are also the epitome of shareholders. In this sense, managerial loss aversion (Wiseman and Gomez-Mejia, 1998) comes into prominence as a significant factor. The term of 'loss aversion' refers to conservative behaviour in terms of managers.

Therefore, this behaviour forces them to protect their wealth rather than attracting further wealth. Because, if they reduce the firm's value, this also connotes to make a reduction in their own wealth. In addition, managerial ownership can be influenced by several essential factors such as industry norms and environmental conditions. Because of these reasons, managers prefer to pursue a conservative and protective strategy in order to maintain their existing resources. Next section will review type of risk-taking capabilities.

#### 2.1.3.2.2. Operating Risk

Operating risk refers to firm risks that may arise from firm operations in the short term. The analysis of the effect of operating risk on performance drew on two different approaches. According to the prospect theory approach, changes in risk-taking behaviour as directly reflecting firm's choice about risky investment and therefore firm adaptation behaviours.

Rapid change<sup>106</sup> may harm performance to commit fewer resources to short-term activities, daily operations and most likely to not generate slack to long-term investments and firm survival. Slack resources, nevertheless, are adaptable and can swiftly be re-oriented towards present enterprises and projects.

Some researchers posit that when managers are a specific range from the usual point of reference, they alter their view on the survival index (Das and Teng, 2001, James G March and Shapira, 1987, Oppen et al., 2016). The threat-rigidity theory elucidates why firms choose survival point (Staw et al., 1981). Therefore, a configuration of slack resources and operating risk appears to be pertinent to greater level of performance.

It is clear that unification of strategy and activities or alignment in between internal and external environment is extraordinarily important in adaptation process to the future survival. It will not be possible to align all firm resources and activities with demands from the external environment. However, a concerted effort must be made to evaluate firms' current strategy, goals, and available resources to ensure that, insofar as possible, they are aligned with the external environment's demands and requirements.

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<sup>106</sup> There are several studies that propose, as well as configuring a company with the market and assets, companies may derive value from matching their assets with secure judgements. The value of diverse asset changes across company risk-adjustment contexts. The value of tangible and intangible firm resources becomes uncertain in the context of current operating risks. In addition, rapid changes in customer preferences during the financial crisis may render such resources obsolete.

#### 2.1.3.2.3. Strategic Risk

The dynamic influence of *strategic* risk on performance has become a major focus for organizations (Bromiley, 1991). Essentially, monitoring strategic investments, the alignment of strategy and risk provide to firms a guidance on how the firms can move toward or achieve the greater level of future performance.

As a firm effort to accomplish their strategic objectives, both external and internal actions and circumstances can prevent or inhibit a firm from achieving their strategic objectives (Tsai and Luan, 2016). Therefore, strategic risk refers to risk associated future survival, including investment related strategies. Strategic risk can be defined as a function of the compatibility of strategic objectives, which created by managers to fulfil those objectives, and the excess resources deployed against these objectives.

### 2.1.3.3. *Environment and Financial Crisis (External)*

#### 2.1.3.3.1. Environmental Conditions (industry factors)

##### 2.1.3.3.1.1. Environmental Munificence

‘*Environmental munificence*’ can be described as the amount to which the marketplace may permit company growth. Firm growth enables firms to generate slack resources (Cyert and March, 1963), which help firms by creating a buffer when external resources are limited (Klingebiel and Adner, 2015). The degree of environmental munificence influences the flow of resources into a firm, facilitating firms to accumulating slack resources.

It was argued that superior organizational performance provides for managers to generate and stock slack resources. The implication of slack resources on firm performance changes if environmental munificence changes. The level of munificence changes when financial crisis occurs.

In line with Tan and Peng (2003), during the financial crisis when the level of munificence is low, slack may make significant contributions for firms’ survival. Resource capability to tap into a firm’s resource flexibility is important not only to buffer the sudden shocks, but also quickly seize spontaneous opportunities during that period of time.

This view is consistent with BTF perspective. Too much slack may harm firm performance because of high level of environmental munificence since firms are likely to become less cautious when implementing firm strategies during the stable environment. This perspective is more in consistent with agency theory view<sup>107</sup>.

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<sup>107</sup> BTF suggest that slack provides flexibility and mostly helps firms to pursue risky strategies (Brinckmann et al., 2016, Golden and Powell, 2000). Viewed from this perspective, slack is good and can be regarded as source of flexibility. However, according to agency theory, slack is bad and refers to source of inefficiency. Therefore, it can be regarded as source of risk for firms.



According to this view, positive impact of slack may minimize during the financial crisis, but before and after crisis, its impact on performance would be much worse (Vanacker et al., 2016). Accumulating flexible slack resource and level of alignment is more likely to increase in high level of environmental munificence. However, the influence of munificence on adaptability is not direct.

If adaptability and alignment are viewed as alternatives, and therefore involve loss and gain, then when adaptability is most obvious, alignment should be less obvious. On the contrary, when alignment is least common adaptability should be in common. This does not have to be case if alignment and adaptability are regarded as independent complementary constructs.

#### 2.1.3.3.1.2. Environmental Dynamism

Much of previous studies in the management literature has dealt with environmental dynamism and argued that unpredictability and absence of pattern are the best reflective measures of environmental stability and instability/volatility (Chen, 2015b). Companies in a more changing environment will be more liable to adapt homogeneity of industries to enable them to deal with uncertainty.

To deal with uncertainty, firms are likely follow an adaptation process to execute necessary performance that is required by environmental demand. BTF literature suggests that firm strategies and tactics such as using slack as buffer in order to absorb external pressures and fit a more predictable environment. The turbulent environment can lead to unpredictability for firms' future strategies.

If environment is dynamic, a faster adaptation capacity is necessary for immediate response (Chakrabarti, 2015). In dynamic environments, the survival of firms depends more on their resource capability and adaptation to change. Turbulent and high-velocity environments require that managers have a good understanding of resource preferences in order to offer better adaptation capacity that will increase firm performance (Eisenhardt, 1989b).

In contrast, when the environment is stable, with a set of slack with stable preferences, a low level of adaptation orientation is inherently required. Resource needs, the exploitation and exploration activities for firms in the environment change faster and demand a more immediate adaptation (Geiger and Makri, 2006). Firms demand a high level of slack and adaptation processes in dynamic environments. When environment change quickly, adaptation and perception by managers may be insufficient.

The slack resources facilitate to achieve greater flexibility in order to adapt to environment, not only for detecting but also for implementing changes in dynamic environments (Kuusela et al., 2016). Industry dynamism can be affected from unexpected external shocks or hypercompetitive environment.

Conditions of high dynamism may limit during the stable environment and may present small opportunities for firms. Greater level of slack provides firms to be successful in dynamic environments through providing flexibility to adapt quickly to new environment. Adaptability-oriented strategies provide resource flexibility when resource commitment is necessary. Since unexpected financial crisis has significant implications on dynamism of industries, firms cannot afford not to invest in searches over the long-term.

Inversely, the gains of alignment are not great in changing environments. Continual alignment with the current environment may become futile for firms when competitors are rapidly keep discovering new opportunities (Wan and Yiu, 2009, Chattopadhyay et al., 2001). In moderately steady environments, in which is based on productivity and efficiency, firms will concentrate more on generating and accumulating excess resources rather than resource commitment. Therefore, the '*alignment-oriented*' tactics are more effective in an unchanging than a dynamic environment.

#### 2.1.3.3.2. Financial Crisis

Environmental jolts refer to highly unpredictable events with important implications for firm performance. It was described as “*transient perturbations whose occurrences are difficult to foresee and whose impacts on organizations are disruptive and potentially inimical*” (Meyer, 1982: 515; (Bradley et al., 2011a). Environmental jolt is often view as financial crisis (Wan and Yiu, 2009). Crisis can influence the predictability of demand, the supply of resources, and thus resource availability and commitment for firms. Unpredictability of demand and scarce resources can lead to critical alteration in firm operations. The level of munificence may change dramatically due to unexpected environmental jolts.

During the financial crisis, environment may neutralise existing strategies (Meyer, Brooks, and Goes, 1990) and increase firm risks (Wan and Yiu, 2009)). Financial crisis also can influence the pattern of positional advantage, hence revealing previously protecting firms to new environmental turmoil. High level of convertible slack resource during and after crisis provides firms with great flexibility. This flexibility enables firms to swiftly adapt current processes and more quickly redeploying resources (Wan and Yiu, 2009).

The economic crisis of 2007-8, which was a major environmental jolt (Meyer, 1982), simultaneously influenced multiple industry and increased level of risk for firms, especially in several western European countries by sharply and unexpectedly changing resource demand and credit conditions. Another academic debate can be made regarding how firms handled such risky conditions and environment turbulence (Zheng and Yanjun, 2010, Makkonen et al., 2014, Meier et al., 2013). However, limited scholars have examined the changes in slack management that firms implemented in reaction to the financial crisis and their performance impact in the context of risk-taking capabilities, adaptation and ambidexterity.

Financial crisis of 2007-8 has led to a rapid change in the environment and drop in resource investment. Such a rapid change caused a major and immediate impact on firm's adaptation and investment strategies. Onset of and during the financial crisis, many firms may have perceived a cognitive image of the future in which their performance level would be below their performance goal. On the other hand, consistent with behaviour theory and prospect theory, if firm's target is below the firm's performance expectations, this could trigger changes in firm strategies wish to restore performance to at least previous conditions by taking risky initiatives (Shimizu, 2007).

#### 2.1.3.3.3. Stages of Financial Crisis and Organisational Adaptation

These sudden changes or "environmental jolts" (Meyer, 1982): 515) seldom cause the collapse of a firm but can indicate the overall capacity to change with its surrounding marketplace and jolts are often linked with crisis (Lengnick and Beck, 2005). The financial crisis of 2007-8 can be labelled as an environment jolt. In discussing the impact of environmental jolts on organizations, Meyer (1982) developed a three-phase model of organisational adaptation which indicated that adaptations to jolts are when the negative news may be obvious, 'anticipatory phase' ( pre-crisis ) when the first effects are being felt, and 'responsive phase' (during the crisis) when the worst has abated.

In the 'readjustment phase' ( after crisis ), while it may not be feasible to stop the next occurrence or reorganise the firm to prepare for the next event, firms can still prepare for future crisis either by accumulating slack as buffers and/ or invest slack resources to create options or capability base for future contingencies. The former move can make the organisations more passive and the latter more proactive (Kraatz and Zajac, 2001) towards responding future crisis. In the '*responsive phase*' (*during crisis*), the market experiences a sudden, important, but short-lived trauma.

It is generally described as being in perpetual flux (Volberda, 1996). The outer environment moves in jagged, changing patterns that never achieve balance (Levy, 1994, Stacey, 1995). It may be short-lived, but of its essence, volatile and choppy, making alignment (fit) extremely difficult. Ansoff and Sullivan (1993) argue that times of crisis are usually linked with unexpected sides of predicted events as well as alarming happenings that cause more of a strategic misfit as permanent adaptation becomes increasingly difficult.

Therefore attempts to achieve permanent alignment with the crisis environment through adaptive specialisation maybe impossible as this new environmental state may require successive, temporary but continues "fit" by practicing *strategic flexibility* (Starbuck et al., 1978). It is widely recognized that strategic flexibility is a key strategic dimension of a firm's response to turbulent environments (Chen, 2015b, Brozovic, 2016). Firms may require different forms of flexibility to manage the “during crisis “stage because of the multidimensional state of the crisis environment (Kraatz and Zajac, 2001).

For example firms may require *resilience* to withstand shocks without significant performance detriment during crisis as well as *robustness* to continue functioning in the presence of continuous and unpredictable changes without the fundamental changes in its slack deployment (Evans, 1991, Bahrami and Evans, 2010).

The readjustment phase (*after the crisis*) is generally associated with firms' attempts to re-adapt to their new environments after the shocks are subsided. Corrective actions may be needed to minimize the negative consequences of the crisis and strategic flexibility in the form of *corrigibility* may enable healing capability and a return to a prior operable state of functioning. Rapid actions are also necessary to eliminate the negative consequences of the crisis quickly, therefore flexibility in the form of *liquidity* may be required whereby strategic slack can be recovered with minimum friction to make it available for quick deployment.

Figure 2.17 illustrates stage of financial crisis overtime and distribution of performance outcomes. As can be seen from the figure 2.17, after the financial crisis shocks, firms pursue adaptation processes during the responsive phase in order to achieve one of the specified performance outcomes.

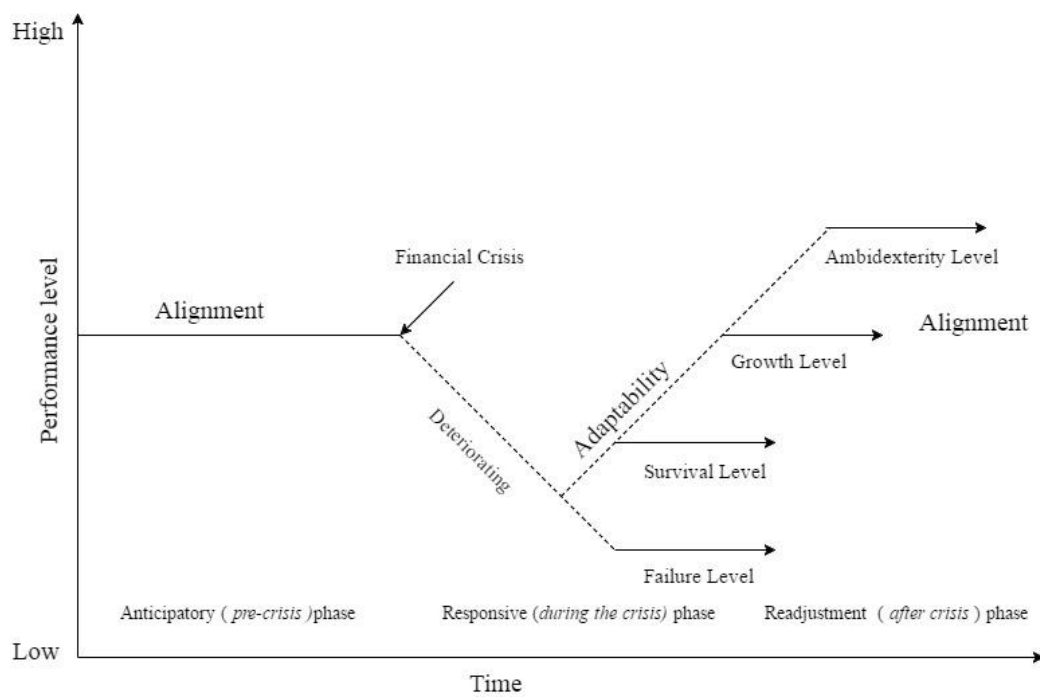


Figure 2-17 - Level of Performance and stage of financial crisis

#### 2.1.4. Resource Ambidexterity

Companies faces tough competition and significant resources difficulties during the environmental uncertainty due to their decisions on deployment and allocation strategies of resources. The only way to survive and maintain competitive advantage is by continuously performing adaptability and alignment oriented strategies. (Eisenhardt, 1989a)<sup>108</sup> examined how firms make fast strategic decision and how these decision speed link to firm performance in a high-velocity environment. Furthermore, simultaneous decisions are required with concurrent consideration of multiple options.

Conversely, “*slower decisions were characterized by sequential consideration of fewer alternatives*” (Eisenhardt, 1989:556). Simultaneous alternatives can be seen as strategic options that managers take into consideration during part intersecting time stages, while successive variations can be used when there is no commonality (Eisenhardt, 1989b). Simultaneous alternatives also help firms to reduce the escalation of resource commitment to any strategic option. Managers that possess multiple options can switch the options rapidly when facing negative situations (Sanchez, 1995).

Slack management allows firms to create strategic options through trading-off resource flexibility and resource commitment. Thus, firms can easily achieve the adaptation process through having such options. The need for using both adaptability and alignment activities was presented by Tushman and O'Reilly (1996) when they hypothesized the notion of the organizational ambidexterity.

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<sup>108</sup> He argued that making fast decision in a high velocity environment inherently requires more information as well as developing more alternatives than slow decision-makers do.

Ambidexterity involves alignment and adaptability focused on resource creation and allocation, respectively, through a range of organizational capabilities and processes that includes generation, acquisition, assimilation, transformation, exploitation and re-generation of specific resources in a cycle.

Specifically, resource exploitation comprises leveraging current capabilities to create and then extract valuable and specific resources available from the organization and current environment (Voss and Voss, 2013). In this way, alignment and adaptability-oriented strategies can be more beneficial to help to have improved competitive market places in the current environment (Venkatraman et al., 2007, Voss and Voss, 2013, Josephson et al., 2015).

Firms' resource-flexibility and resource-commitment activities mainly involves various adaptation strategies (Dolmans et al., 2014). Resource exploration and exploitation works better when they are used together to keep competitive position (Vorhies et al., 2011) in a changing environment. Hence, ambidexterity, the collaboration of alignment and adaptability in tactical operations, was reviewed from the viewpoint of organizational slack.

The fundamentals underpinning *ambidexterity* interrogate regarding suitable emphasis on '*alignment and adaptability*'. Many scholars posit that such arguments are in conflict (Raisch et al., 2009). Scarce slack need to trade-offs leading to concentrate on alignment and adaptability so that the upsurge of alignment brings the death of adaptability and the corollary.

On the other hand, several studies (Andriopoulos and Lewis, 2009) purposes that these two constructs can coexist concurrently. Existing arguments propose that a trade-off between adaptability and alignment as relatively emphasising on both equally is ideal. This enable firms to be both short-term and long-term oriented standing in balance, satisfying existing environmental demands while concurrently achieve to their long-run objectives (He and Wong, 2004).



Even though theoretically ambidexterity seems to stay in balance, several scholars pointed out that an organization does not often achieve such a balance in practice (Raisch et al., 2009). For that reason, firms accentuate and concentrate on only one orientation more strongly rather than both orientations equally, depending on their needs and context (He and Wong, 2004).

The blend of alignment and adaptability orientations in resource-ambidexterity is an ever-changing (dynamic) progression and not a fixed one (static), with a shift in the bend of alignment and adaptability orientations in its ambidexterity as it attempts to achieve superior firm performance. Hence, while both adaptability and alignment actually prevail in ambidexterity, environmental elements may cause them to move (Raisch et al., 2009). The nature of these shifts was demonstrated in figure 2.18 in more detail below.

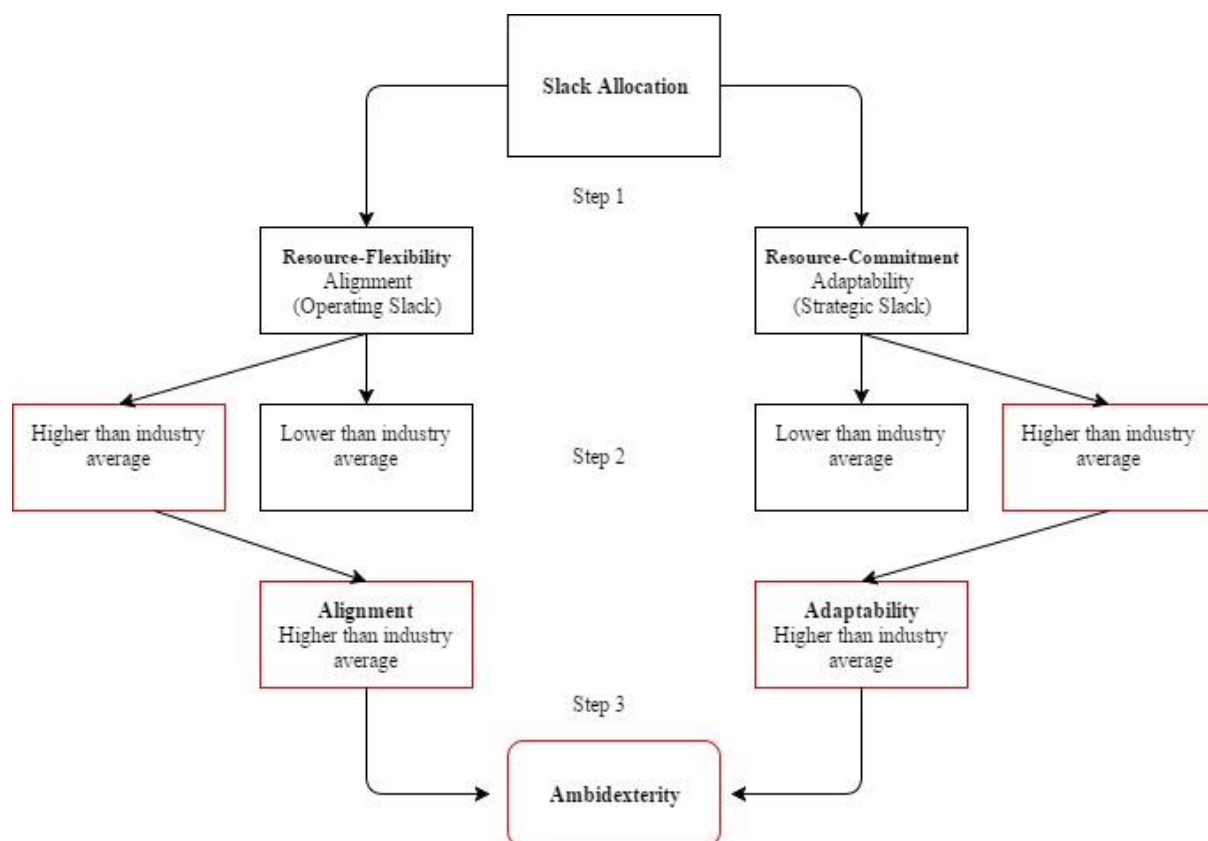


Figure 2-18 - Computation of Ambidexterity Constructs

Figure 2.18 shows different steps of slack allocation towards ambidexterity. In the first stage, firms make a choice depending on their form and level of slack reserve. If shifts toward alignment (using mostly operating slack) in slack-management mean focusing on greater efficiency, firm growth, and refinement of current resources and capabilities for the improving of short-term performance outcomes.

The major issue is to focus on current operations and daily routines. In contrast, if shifts toward adaptability (using mostly strategic slack) in slack-management suggest greater flexibility and refinement of long-term resources and capabilities for the optimization of future performance outcomes such as survival and profitability (He and Wong, 2004). It is also important to mention here that shifting adaptation-process focus strategy takes time and usually happens overtime (Gupta et al., 2006). Moreover, sticking to an alignment and adaptability oriented strategy shift in slack management for too long damage firms' objectives.

Due to excessive concentration on value extraction, firms may face a “*success trap*” that can lead to “financial stress from eventual value depletion due to over-extraction” (Josephson et al., 2015):541). This may come about because, one of the major objective of firms is to extract the maximum value from its current resources and capabilities in a turbulent environment. However, if firms lack sufficient resources and capabilities to generate additional value for future, this may lead to long-term threats. For example, investing in crucial resources during the financial crisis includes risk and following the adaptability-oriented strategy may require risky initiatives and extensive search to create successes. Therefore, firms must ensure they have sufficient inflow of vital operating slack resources when align with their environment, if they want to shift cycle properly for continuous ambidexterity (Anderson 1982). Ambidexterity has positive implications on firm prosperity (Hsu et al., 2013). Firm adaptation process is shaped by uncertainty (Gral, 2013, Teece and Leih, 2016). Such uncertainty play a significant role in differentiating between alignment and adaptability.

#### 2.1.4.1. How is Ambidexterity Achieved?

There are several perspectives<sup>109</sup> to achieve with organizational ambidexterity such as sequential ambidexterity, simultaneous/structural ambidexterity and contextual ambidexterity (O'Reilly and Tushman, 2013). However, in this study, only two of these were considered because these two ambidexterity constructs are related to firm strategy and time-period (Venkatraman et al., 2007): simultaneous ambidexterity and sequential ambidexterity.

According to this perspective, “sequential ambidexterity” develops out of the dynamic, temporal sequencing of routines for alignment and adaptability (Goossen and Bazazzian, 2012). On the contrary, most of organizational ambidexterity studies mean as “simultaneous ambidexterity” that shows simultaneous pursuit of alignment and adaptability (Raisch et al., 2009).

Scholars have suggested a number of organizational solutions that allow firms for being ambidextrous (Venkatraman et al., 2007). According to Raisch et al. (2009), these researches use static perspective that suggests that organizations become ambidextrous by adjusting certain patterns. Contextual ambidexterity or static vs. dynamic ambidexterity comprise both simultaneous and sequential ambidexterity.

However, ambidexterity was studied to compare different levels of ambidexterity such as static vs. dynamic ambidexterity, individual vs. organization ambidexterity, differentiation vs. integration ambidexterity, and internal vs. external ambidexterity, respectively (Raisch et al., 2009). Next section explains simultaneous and sequential ambidexterity briefly. The choice of sequential and simultaneous ambidexterity can be attributed to three factors: (1) industry concentrations, (2) strategic risk, and (3) environmental dynamism.

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<sup>109</sup> Several studies have suggested that dichromatic nature of ambidexterity, i.e., balancing and/or combining alignment oriented and adaptability-oriented strategies, leads the superior firm performance (Raisch et al., 2009).

#### 2.1.4.1.1. Simultaneous Ambidexterity

Following the Venkatraman et al. (2007), *simultaneous ambidexterity* was defined as the ‘pursuit of process of alignment and adaptability concurrently.’ It indicates firms are stimulated and supported to simultaneous balance alignment and adaptability as necessary (Parida et al., 2016, Raisch et al., 2009, Patel et al., 2013b). This ability enables organizations to manage current resource position concurrently in the environment (Stettner and Lavie, 2014, Zhang et al., 2016a).

Simultaneous ambidexterity is closely related to daily routines through alignment-oriented activities, while simultaneously developing new capabilities through adaptability-oriented activities (Lubatkin et al., 2006). Simultaneous ambidexterity is mostly related to exploitation of the current resources (Goossen and Bazazzian, 2012) and temporal environmental changes (Stettner and Lavie, 2014).

Slack resources enables firms to balance the tension between alignment and adaptability in distinct specialized capabilities, when this option is not be available in case of facing resource constraint (Martin et al., 2015, Dolmans et al., 2014). Engaging in adaptability activities cause additional resource commitments that reduce the existing resource available for alignment related activities.

Hence, limited resources can induce the pursuit of a single-focused adaptation strategy or sequential ambidexterity rather than simultaneous ambidexterity (Voss and Voss, 2013). A certain level of adaptation capacity enables firms to overcome natural tensions between simultaneous alignment and adaptability and therefore enabling the firm to stimulate ambidexterity benefits more precisely (Mudambi and Swift, 2014, Swift, 2015, Stettner and Lavie, 2014).

However, simultaneous ambidexterity<sup>110</sup> may distract managers' attention and firm resources (Wassmer et al., 2016). For this reason, implementing diverse changes at the same time can be sometime problematic and prone to failure (Yayavaram and Chen, 2015). Additionally, since alignment and adaptability are based on different resource allocation and deployment, pursuing them simultaneously decelerates the generating new resources and capabilities.

#### 2.1.4.1.2. Sequential Ambidexterity

Sequential ambidexterity can be seen as '*sequential allocation of slack resources in different level at different times*'; '*temporal achievement of alignment and adaptability*' (Gupta et al., 2006); "*switching strategy*" (Reeves et al., 2013); or "*temporal division before decentralizing*" (Siggelkow and Levinthal, 2003, Rillo, 2016).

Perhaps the one of the most ambivalent view on how firms use alignment and adaptability oriented strategies is via sequential ambidexterity (Goossen and Bazazzian, 2012). Firms alternate between these adaptation processes over time as environmental conditions change (Tushman et al., 1985). Environmental dynamism can designate the existence of sequential ambidexterity, wherein organizations move between alignment and adaptability activities (Mudambi and Swift, 2014). It was indicated from the earlier studies that sequential ambidexterity has implications on organization far beyond firm performance such as survival of firm (Mudambi and Swift, 2014, Raisch et al., 2009, Voss and Voss, 2013). Specifically, adaptation capacity and resource capability provide insights on organizational characteristics that are required to make the leap successfully from alignment to adaptability.

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<sup>110</sup> On the other hand, it remains empirically ambiguous whether simultaneous ambidexterity is characterized by choice of resource flexibility/resource commitment option when facing a dynamic environment. In theory, ambidextrous firms should have ability to balance resource flexibility and commitment skilfully.

Organizations improve their adaptation capacity and resource capability in a path-dependent way, by engaging in resource flexibility and resource commitment over-time. Both adaptation capacity and resource capability are specifically beneficial when organization engage in sequential ambidexterity. However, firms are often in a dilemma as focusing on only alignment and adaptability is irrelevant given the risks that consist of pursuing a single adaptation process. Sequential ambidexterity enables firms to ease the tensions using temporal separations through implementing both alignment and adaptability in sequence (Josephson et al., 2015, Karrer and Fleck, 2015, Patel et al., 2013b, Veider and Matzler, 2015).

Therefore, sequential ambidexterity is accepted as a continuous adaptation (Venkatraman et al., 2007). Punctuated equilibrium can be considered as adaptation cycling through periods of alignment and adaptation (Bouzdine and Dupouët, 2009, Gupta et al., 2006, Broersma et al., 2016). Related to this view, sequential ambidexterity can be defined as an alternative way to achieve a balance between alignment and adaptability (Venkatraman et al., 2007).

Specifically, when moving from a stable environment to turbulent environment, firms may need to pursue sequential ambidexterity strategies because of providing a complete adaptation cycle. Acting in this way is most likely to result in positive performance achievement for firms (Mudambi and Swift, 2014, Voss and Voss, 2013). Due to conducting alignment and adaptability processes at different time periods, sequential ambidexterity can prevent the difficulties arising from pursuing of conflicting strategies (Gupta et al., 2006, Venkatraman et al., 2007). Therefore, firms with pursuing sequential ambidexterity strategy is more likely to succeed than firms with simultaneous ambidexterity strategy. Table 2.8 shows some recent studies related to simultaneous and sequential ambidexterity.

Study	Sample	Industry	Definition		Type of Ambidexterity	Context	Theory	Type of Research	Model
			<b>Simultaneously Ambidexterity</b>	<b>Sequential Ambidexterity</b>	<b>Title</b>				
(Diaz et al., 2016)	Questionnaires	Manufacturing firms	Simultaneously ambidextrous organisations are aligned and efficient in their management of today's business demands while simultaneously adapting to changes in the environment	Sequential ambidexterity, where organisations shift temporally between periods of exploitation and exploration	Simultaneous & Sequential	Ambidextrous	Organisational Learning Theory	Qualitative	CFA (factor)
(Duh et al., 2016)	Questionnaires	Slovenian SMEs	Harmonic ambidexterity is also known as contextual ambidexterity [...] that simultaneous exploration and exploitation within the same business unit (or small firms) are not only possible, but also crucial for business success in the short term and long-term sustainability	Cyclical ambidexterity (i.e., the sequential pursuit of ambidexterity within a single unit), in which firms are engaged in long periods of exploitation and sporadic periods of exploration, is common for business units with a strong technological orientation, whereas reciprocal ambidexterity (i.e., the sequential pursuit of ambidexterity across units), which has received the least attention from researchers assumes reciprocal interdependence between exploration and exploitation units.	Harmonic ambidexterity (simultaneous), Cyclical ambidexterity & reciprocal ambidexterity (sequential)	Ambidextrous	Dynamic Capability Theory	Quantitative	Factor Analysis & ANOVA
(Jurksiene and Pundziene, 2016)	Theoretical	N/A	organizational ambidexterity supports simultaneous development of exploration and exploitation	N/A	Simultaneous	Ambidexterity	Dynamic Capability Theory	Qualitative	N/A
(Dunlap et al., 2016)	Theoretical	N/A	Balanced dimension (i.e., the capacity to simultaneously create new products and incremental product innovations)	Combined dimension (i.e., the capacity to leverage new and incremental product innovations)	Simultaneous & Sequential	Ambidexterity	Knowledge-based view	Qualitative	Multiple Regression
(Schad et al., 2016)	Theoretical	N/A	ability for organizations to simultaneously explore and exploit, thereby enabling superior, long-term firm performance	Temporal Orientation: Temporal separation allocates competing demands to sequential time periods [...] depending on current demands for efficiency and incremental innovation versus change and radical innovation.	Simultaneous & Sequential	Ambidexterity	Meta-theory of paradox	Qualitative	N/A

(Spieth and Clauss, 2015)	Theoretical	N/A	Simultaneously pursuing exploitation and exploration within a single organizational unit is inherently challenging as a consequence of the competition for scarce resources that often leads to conflicts, contradictions, and inconsistencies	Sequentially pursuing exploitation and exploration may not entail ambidexterity in the sense of doing two things equally well within the same time frame.	Simultaneous & Sequential	Ambidexterity	social exchange theory	Qualitative	CFA (factor)
(Gaim and Wahlin, 2016)	Theoretical	N/A	Spatial separation, also called structural ambidexterity, occurs when organizations designate different units to deal with issues such as exploration and exploitation	temporal separation, also called temporal ambidexterity, occurs when firms attend to one demand at a time, that is, they first focus on, for example, exploration then exploitation	Simultaneous & Sequential	Ambidexterity	Organizational Theory & Paradoxal View	Qualitative	N/A
(Karrer and Fleck, 2015)	Theoretical	N/A	Spatial separation, in turn, enables simultaneous exploration and exploitation activities in the organization. This is often called architectural or structural ambidexterity.[...] the implementation of spatial separation seems to require resource allocation metrics tailored to the nature of exploration and exploitation activities: while goal-centric metrics fit exploitative efforts, discovery-driven metrics suit exploratory efforts, which tend to focus on learning	Temporal separation refers to the same set of resources carries out exploration or exploitation at different time-periods. [...] by introducing cyclical focus on exploration and exploitation into the organization. Ambidexterity may be fostered through sequential attention to goals or rhythmic pacing of tasks. However, this practice requires managerial foresight to identify when to change from exploration into exploitation, and vice-versa.	Simultaneous & Sequential	Ambidexterity	Organisational Learning Theory, behavioral view, RBV, population ecology	Qualitative	N/A

Table 2-8 - Some recent studies related to simultaneous and sequential ambidexterity



## Summary

Chapter 2 was aimed at first defining organizational slack in detail. Specifically, it explained how concept of slack was embraced in previous literature, what forms of slack are, what the functions of slack are, what the antecedents of slack are, and what the potential and functional use of slack are, respectively. The review of the slack-performance relationship was introduced from the perspectives of traditional and non- traditional. Chapter 2 also explained slack management process, organizational characteristics as internal factor, risk-taking capabilities as internal factor and environment and financial crisis as external factor. Finally, simultaneous and sequential ambidexterity were examined.

# Chapter 3

## Introduction

The Chapter 3 defines, explains and develops adaptational slack, adaptational slack allocation and hypothesis development, respectively. In the adaptation slack section, two forms of adaptational slack were briefly defined. It further investigated the allocation mechanism of adaptational slack. Hence, the question of '*why adaptational slack is a need for firms*' has been addressed. Then, adaptation profiles, which derived from adaptation slack resources, were defined and compared to reveal similarities and differences. Finally, related hypotheses were developed and designed for each factor that are believed to influence the slack-performance relationship, which includes slack-performance relationship, adaptation process, adaptation profiles, financial crisis, environmental conditions, higher and lower performer firms, risk-taking capabilities and resource ambidexterity.

### 3. Conceptual Framework and Hypotheses Developments

Creating a conceptual framework offers another way to explain the slack-performance relationship. Such a framework enables potential readers to apprehend the context by moving back and forth between the main concepts, depending on the respective task required. So far, empirical research was focused on existing literature.

To explain the slack management process, the adaptation mechanism of slack resources was evaluated, in a specific context, by researcher with specific, if not idiosyncratic interests, and systematic empirical exploration. A conceptual framework shows the slack management process and its specific nature that inseparably combines factors of decision and enforcement.

While it focuses primarily on slack allocation settings and adaptation dimensions, it also pays attentions to the analysis of the risk-taking capabilities and environmental factors involved. Rereading the research objective, research gaps and research question while paying attention to those levels may bring the basic role of concepts markedly to the fore.

In collaboration with existing concepts and theories, adaptational slack was created so as to clearly reveal interactions between the internal and external demands during the slack management process. Then, its allocation mechanism was explained. Figure 3.1 shows the conceptual framework of this thesis.

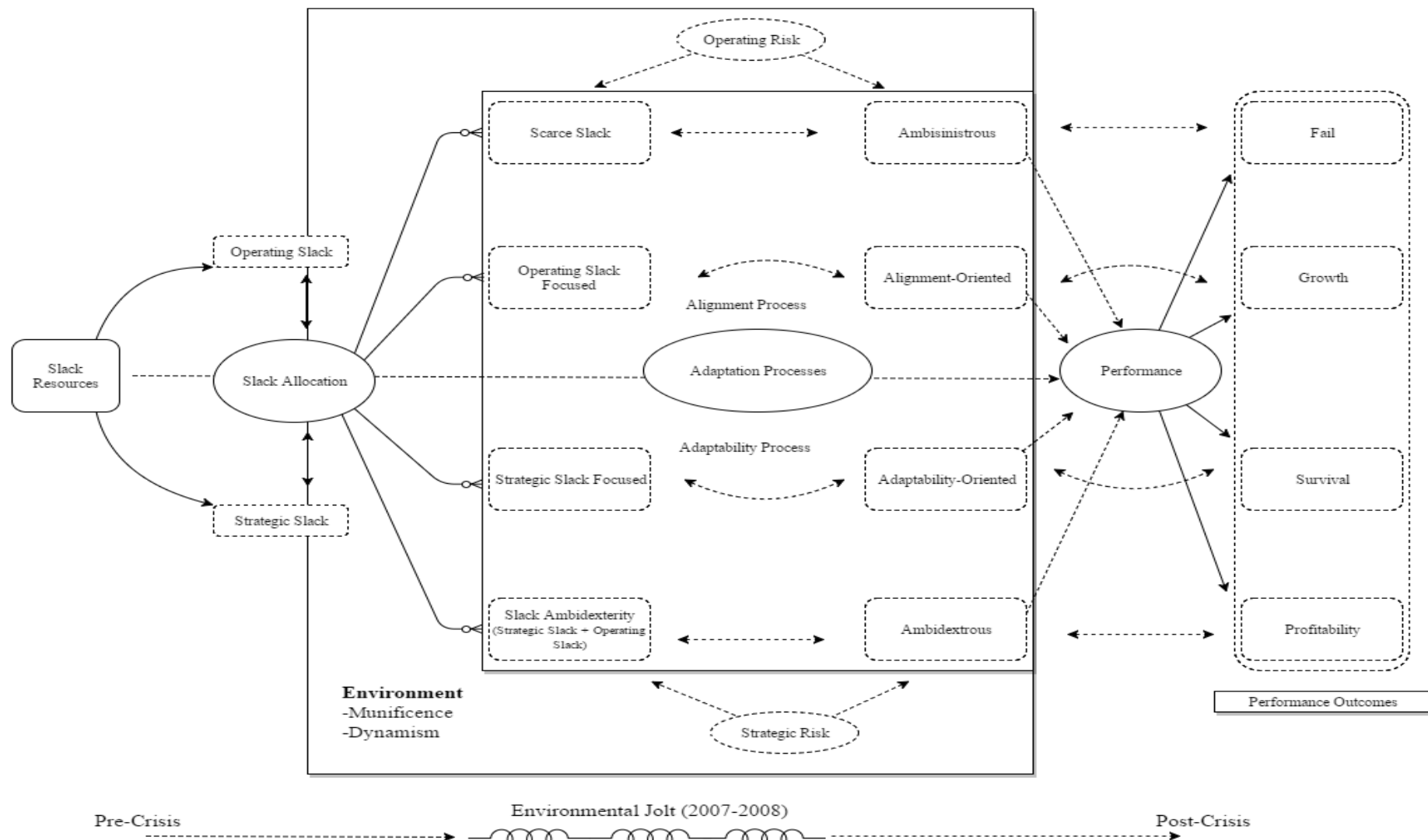


Figure 3-1 - Conceptual Framework

### 3.1. Adaptational Slack

Adaptational slack can be defined *as a function of slack management that bridges the interactions between stable and unstable environments as an input-process-output cycle*. It helps firms to accumulate operating slack resources after fulfilling current routines, while also committing these resources effectively to future environmental demands. The concept of adaptational slack stresses the *temporary deployment of slack* (George, 2005). The distinction between operating and strategic slack is theoretically significant and important for two reasons.

First, adaptational slack separates resource-flexibility from the resource-commitment embedded in the organization. By doing so, it underlines the redeployment patterns of firms' resource commitment and generation profiles, as the aims and the assessed adaptation capacity of firms against unexpected environmental shocks.

Secondly, one can distinctively classify the performance outcomes of resource commitment and resource flexibility using adaptational slack (Dolmans et al., 2014). Firms can experience pressure due to the higher environmental demand (i.e., environmental jolt). However, if firms do not have sufficient resources within the organization, they may search radically different strategies from firms with higher levels of flexible resources, but lower environmental demand (stable environment). Therefore, the argument for adaptational slack was developed, as it offers substantial and relevant insights into the effect of slack on performance, especially before, during and after financial crisis.

The resource based view, resource constraints arguments, behaviour and agency theories appear to diverge regarding expectation for adaptational slack. BTF proposes that resource commitment and its flexibility are heterogeneous. Slack provides relative internal resource requirements as well as reflecting absolute levels across business environment (Wan and Yiu, 2009).

Organizational choice can be influenced by both relative and absolute levels of slack, which stimulating taking risky initiatives and exploration activities. However, RCT suggests that fewer resources positively influence performance. Additionally, agency theory also supports the argument that less adaptational slack resources are better for firms (George, 2005, Dutta et al., 2016). Furthermore, RBV and RCT support district arguments and operate at different slack levels. If firms choose strategic slack as their adaptational slack, then firms may bootstrap and search more efficient alternative uses for limited capital (Paeleman and Vanacker, 2015).

However, at greater levels of operating slack, managers may choose to take risky initiatives such as technological development and experiments and become more proactive through adaptability process in their strategic choices. The minimal levels of both dimensions may provide minimal effect on performance or cause a failure.

Combining these arguments, the adaptability slack and performance relationship can be either linear or curvilinear if adaptability slack is significantly positive or significantly negative but where performance is low when adaptability slack is minimal. Adaptational slack was considered in this study in two forms: in the form of (1) operating slack and (2) strategic slack.

### 3.1.1. Operating Slack

Operating slack can be defined as a form of '*surplus capacity*', a buffer of '*shock-absorbing*', a '*risk reduction strategy*' or a '*chance of survival*' that may be easily attained and broad in use to maintain a firm's daily operations (Azadegan et al., 2013a):2). The role of *operating slack* can be distributed over a large area such as temporal, labour-centric, liquid, physical, external excess resources (Azadegan et al., 2013a, Manikas and Patel, 2016).

In different disciplines such as management literature, *operating slack* has been characterised as forms of availability, unabsorbed, financial, recoverable and generated slack, forms that are highly flexible and easy to reassign for firms' routines (Xu et al., 2015, Liu et al., 2014). The general justification for this characterization is that *operating slack* can be described as resources that are convertible for daily routines that makes it easier to regain and use for other intents. Statistical confirmations also support this argument. It was considered a form of resource that is highly discretionary and ready to use for firm current operations.

Organizational management studies have concentrate on the reasonable implications of *operating excess resources* by classifying how diverse forms of operating slack can augment firm performance. For example, Kleindorfer and Saad (2005) stressed that operating slack is a significant means for moderating firm's disruptions.

On the other hand, some studies have underlined how slack reduces firm output. Literature on organizational management, for example, has emphasized the expenditures of stocking slack resources (Arora and Dharwadkar, 2011, Banalieva, 2014, Chiu and Liaw, 2009, Hong and Shin, 2016, Kuusela et al., 2016). Mizutani and Nakamura (2014) itemised and exhibited the forms of slack advantageous under different organizational backdrops.

Unfortunately, a comprehensive concept that determines the effects of slack in different environmental conditions does not exist. However, some scholars have used several management and financial concepts such as strategic flexibility and financial flexibility to define environmental changes by using slack as a proxy measure (Bradley et al., 2011b, Oktemgil and Greenley, 1997, Bahrami and Evans, 2010).

For example, Oktemgil and Greenley (1997) used a strategic flexibility model in order to establish the degree to which buffer allocation can be used to regulate activity variability. These researchers applied an internal and external perspective to explain the alignment processes to one blockage while using operating slacks to safeguard against variations and to current daily activities.

### 3.1.2. Strategic Slack

Strategic slack is a very polymorphous construct which designates a wide range of principles of commitments (Josephson et al., 2015, Grewal and Tansuhaj, 2001). For example, in general, studies have employed the term to address the higher-order construct for resource-commitments (Autry et al., 2005, Bradley, 2007, Mosakowski, 2002).

However, an investment-centric view of strategic slack was considered to investigate its impact on firm adaptation strategies, since this study is interested in exploring adaptation through the available slack resources. Strategic slack, hence, denotes the level of offering firms' resource-commitments and supports the creation of strategic options regarding short-term adaptation and future survival (Greenley and Oktemgil, 1998, Klingebiel and Adner, 2015).



The high level of strategic slack enables firms to respond quickly to potential opportunities in environment via their excess resource available. In addition, these options provide a firm the capacity to construct competitive barriers, a better position in the market and increase chances of survival in an environmental shift. Signalling financial distress, weakness in performance, and fragile competitive position (Dolmans et al., 2014, Sanchez, 1995) show a lack of strategic slack.

As such, it is expected that strategic slack plays an integral role in determining firm adaptation strategy in two important ways; first, higher level of strategic slack reflects substantial success in proactive exploratory activities, with a strong portfolio of investment offerings that are already creating significant value opportunities to fit new environmental conditions (Chakravarthy, 1982, Evans, 1991, Makkonen et al., 2014).

In such a position, firms would be likely to change their adaptive behaviour to obtain and retain the value generated from their resource manoeuvrability and resource versatility with stronger exploitative activities (Lele, 1992, Evans, 1991). However, poor strategic slack provides inflexibility that does not generate significant value due to a lack of sufficiently generated slack, failure to meet the environmental demands, and/or shrinking away from their rivals (Paeleman and Vanacker, 2015, Singal and Jain, 2016, Wilson and Amine, 2009).

These firms are compelled to change their adaptation behaviour emphasis more toward exploratory activities in order to retrieve a competitive position with their optimal level of slack resources. However, figure 3.2 describe the position of adaptational slack among other forms of slack resources. Thus, resource commitment is related to *resource uniqueness*. Resource flexibility is related to *resource fungibility*. However, while human resource slack was accepted as the least unabsorbed, fungible and unique resources, financial slack is the most unabsorbed, fungible and unique resources among specified forms of slack resources.

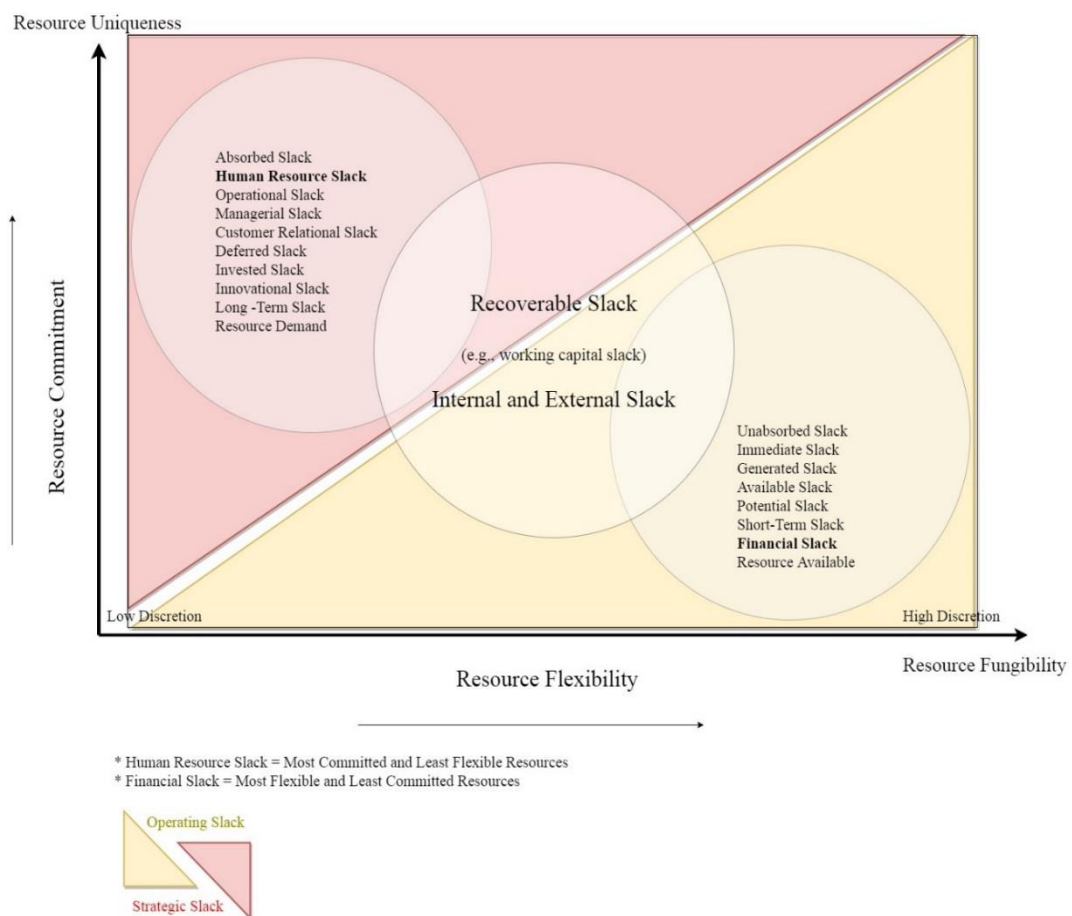


Figure 3-2 - Adaptational Slack Framework

### 3.2. Adaptational Slack Allocation

As both adaptability and alignment are continuous rather than dichotomous constructs ranging from high to low, organisational adaptations can be represented by two independent, but related dimensions (Junni et al., 2013, Josephson et al., 2015, Kortmann et al., 2014, Patel et al., 2013b). The first dimension – *operating slack*, ranging from higher to lower levels, pertains to the quality of firm's *alignment* with its (current) environment.

In this research, such variables as market *–to- book value*, *cash / sales* , *sales/ employee*, *sales/ total assets*, *debt/ equity* are used to indicate the degree of alignment between firm's external and internal environment. The higher the ratios (except debt/ equity ratio – lower) the higher is the firm's alignment with its (current) environment.

The second dimension – *strategic slack*, ranging from higher to lower levels, relates to the organization's *adaptability* to its future unknown and uncertain environments. In this research, slack usage variables as *R&D/ sales*, *working capital/ sales* and *dividend pay-out ratio* are all indicate the degree of firm's adaptability for future contingencies.

The higher these ratios are, the higher is the firm's future adaptability. Based on these classifications it has been identified four adaptation profiles representing four different characteristics of firms namely *ambidextrous*, *alignment oriented*, *adaptability oriented* and *ambisinistrous* firms that constitute the basis of research – (see figure 3.3)

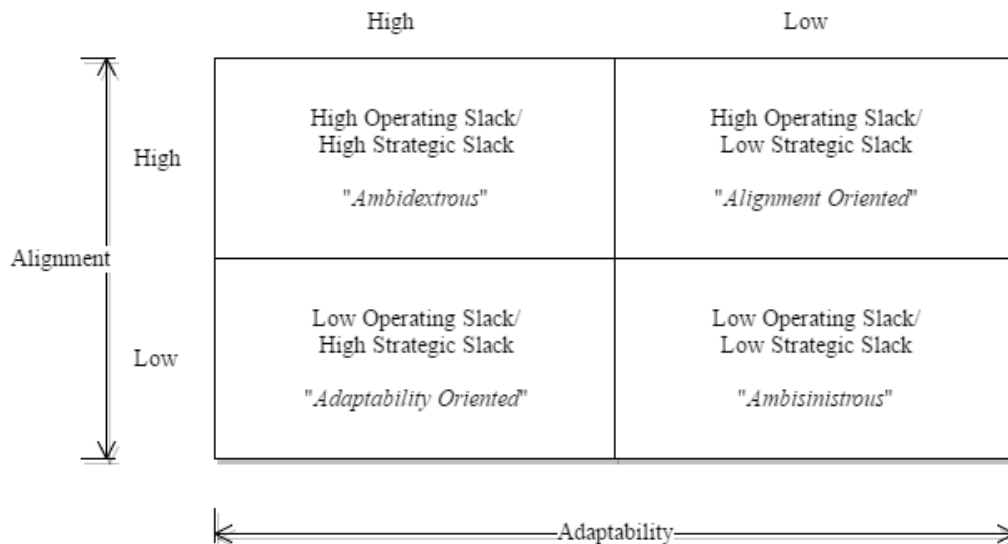


Figure 3-3 - Conceptual diagram for the study

### 3.2.1. Why is Adaptational Slack a Need?

Several scholars draw a clear distinction between similar corresponding concepts of *resource flexibility* and *resource commitment* in different forms (Lin et al., 2009a, Bourgeois, 1981). Alternative dichotomised categorizations of organizational slack were also attempted to discriminate slack disparately and in a different way (Mizutani and Nakamura, 2014, Daniel et al., 2004).

For example, the most common and accepted categorizations between both forms of slack relies on Singh (1986)' concept of *absorbed and unabsorbed slack*; Chakravarty (1986)'s concept of *invested and generated slack*; Sharfman et al. (1988)'s concept of *high discretion and low discretion slack*; Finkelstein and Hambrick (1990)'s concept of *immediate and deferred slack*, George (2005)'s concept of *resource available and resource demand*, respectively (see figure 3.4).

Resource Commitment	Resource Flexibility
(Strategic Slack)	(Operating Slack)
<i>Invested slack</i>	<i>Generated Slack</i>
<i>Absorbed slack</i>	<i>Unabsorbed (available)Slack</i>
<i>Deferred slack</i>	<i>Immediate Slack</i>
<i>Low Discretion</i>	<i>High Discretion</i>
<i>Resource Demand</i>	<i>Resource Available</i>
<i>Long-term Slack</i>	<i>Short-Term Slack</i>

Figure 3-4 - Corresponding Dual Slack Categorizations in Past Studies

These forms of slack regrettably, do not totally cover the alignment and adaptability perspectives in context of financial crisis. Therefore, each environmental state requires distinct and specific resource allocation and deployment capability. In terms of financial historical analysis of firms, before and after a crisis represents environmental stability, but in different conditions, which shows the *state of fit*, while during crisis addresses a *state of misfit* in between internal and external environments (Chakravarthy, 1986, Chakravarthy, 1982, Chakravarthy, 1981, Greenley and Oktemgil, 1998). Instability also refers to environmental uncertainty (George, 2005, Dutta et al., 2016, Mithas and Rust, 2016).

For these results, it can be said that there are three distinct<sup>111</sup> and dissimilar environmental states that must be considered in the context of slack deployment or reallocation, in general; (1) stable periods (fit /alignment) and (2) unstable period (misfit /misalignment). As Figure 3.5 demonstrates, each environmental state intrinsically requires a different level and form of slack resources. In a pre-crisis period, internal and external environments are aligned, and a stable environment naturally leads to the stimulation and generation of excess resources in firms. However, sudden change in the environment may cause resource constraint and financial distress for firms.

<sup>111</sup> Before and after crisis periods show similarity in terms of reflecting environmental stability

In theory, firms prefer to use existing ‘generated slack resources’ by investing them in specific resources or projects to re-align or re-fit the new environment. Similar to pre-crisis period, after gaining environmental stability through adaptability-oriented strategies, firms begin to re-generate slack resources because internal environment and external environment are now aligned and match (Birkinshaw and Gibson, 2004, Birkinshaw and Gupta, 2013, Hodgkinson et al., 2014, Josephson et al., 2015, Venkatraman et al., 2007).

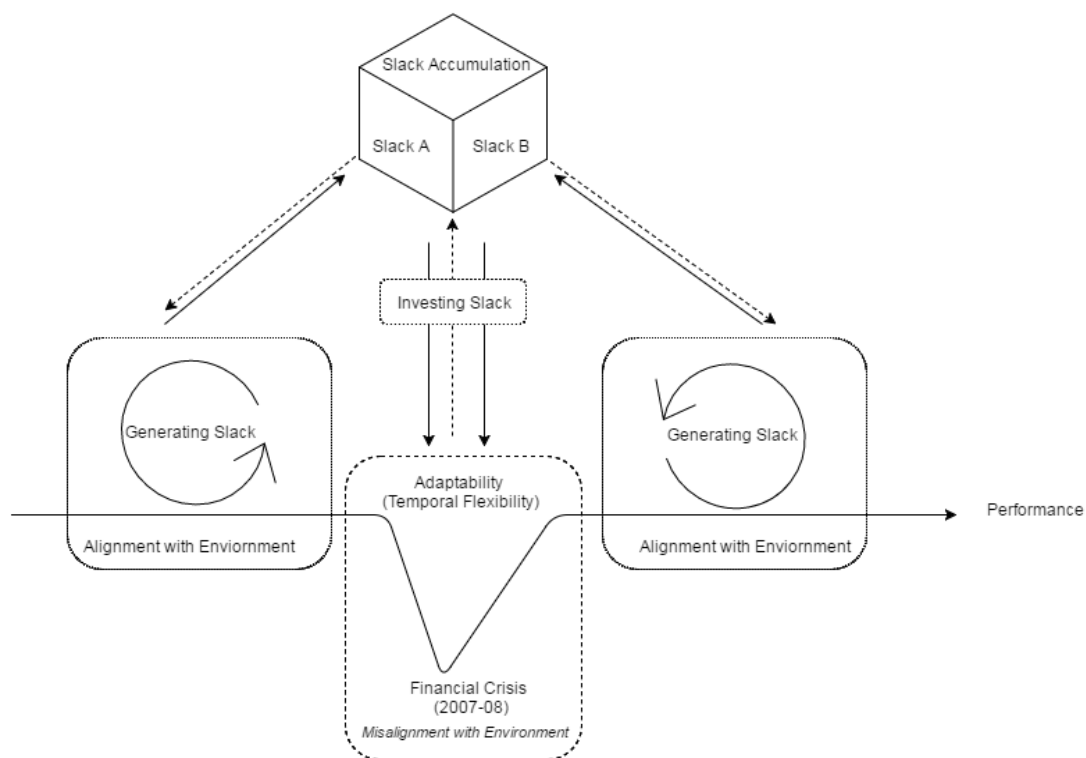


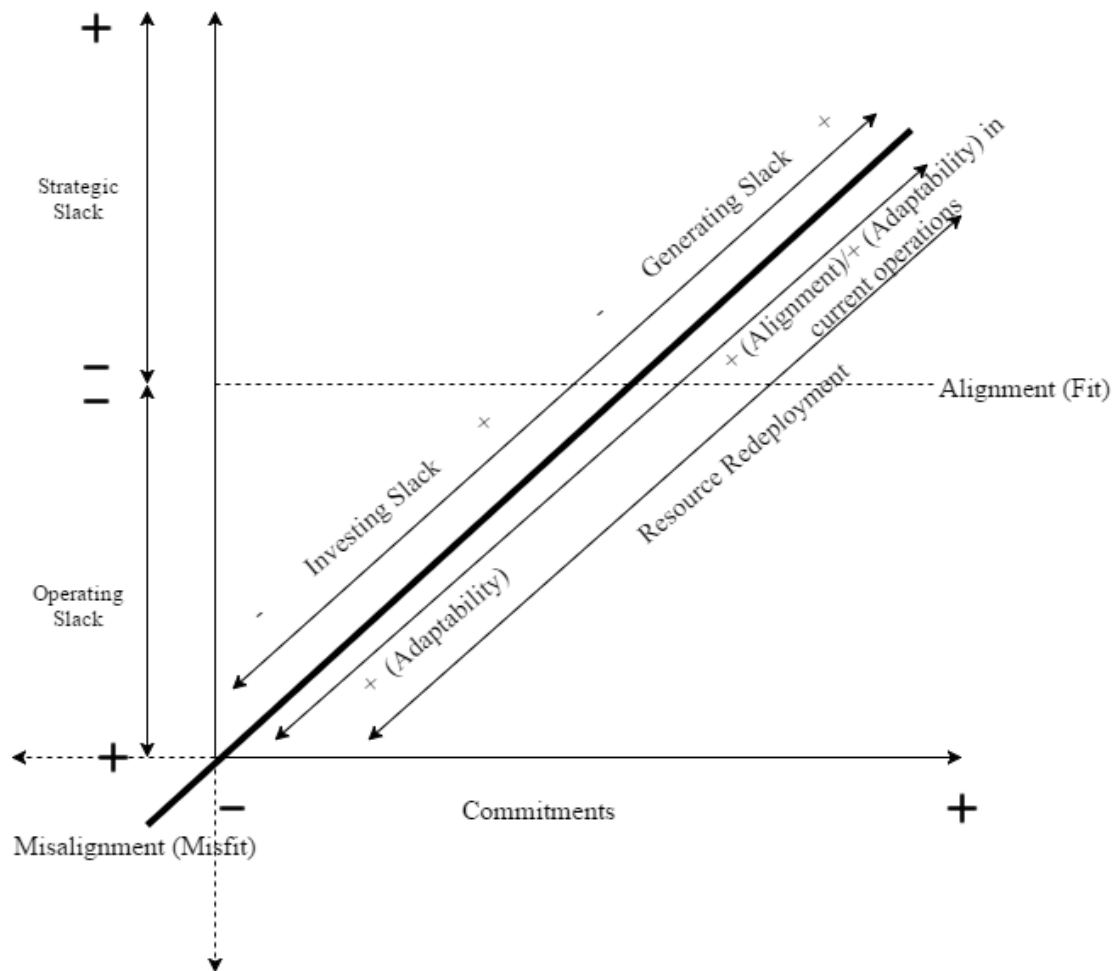
Figure 3-5 - Adaptation Processes in Different Environmental States

On the other hand, it is possible to distinguish between different degrees of resource commitments. The highly committed resources are limited in use and can be preferably be utilized for various investments. Strategic slack can be employed either for daily operations or to invest in specific resources for future gains, but due to its nature and limitation, it is difficult to redeploy to alternative use (Sanchez, 1995). Conversely, operating slack may be readily redeployed to alternative uses.

It is clear from the earlier argument that flexible resources are more easily convertible resources and it is straightforward to assimilate and redeploy them when adaptability is needed in the environment. Strategic slack is most closely associated with resource-commitment, while operating slack is associated with resource-flexibility, enabling alternative uses such as high discretionary slack and low discretionary slack, respectively. At the same time, there are different degrees of commitments influencing strategic and operating slack.

Inventory, dividend and working capital are good examples for strategic slack. R&D and marketing expenses are other examples of strategic slack, but these excess resources are more committed than the former. Figure 3.6 illustrates relationships of adaptational slack and commitment. The thick bold line illustrates the general relationship between resource commitment and adaptational slacks, while the thin lines illustrate specific relationships among adaptability/alignment, investing slack, generating slack, and resource redeployment in Figure 3.6. As shown in Figure 3.6, while they can be employed to current operations (for daily routines), they can also be used with future returns through investing more in specific resources after gaining alignment.

Similarly, human resource slack, leverage slack, asset utilization slack are good examples for operating slack. Cash slack and market value slack are also in operating slack categories, but in a less committed and more flexible form. Strategic slack and operating slack, therefore, are resources that can be accurate in enhancing the existing routines, as well as redeployment of resources for future profitability and survival. Operating slack enables greater resource redeployment and synergies than strategic slack, while the strategic slack is more assigned resources to redeployment.



Note: Inspired by (Argilés et al., 2016)'s model.

Figure 3-6 - Relationship between slack and resource commitments



### 3.2.2. Allocation Mechanism of Adaptational Slack

RBV and RCT portray firms as heterogeneous level and characteristics of specific resources (Chiu and Liaw, 2009, Paeleman and Vanacker, 2015). RBV and RCT puts emphasis on the different characteristic and level of resources that may lead to superior performance outcomes (Barney, 1991, Mishina et al., 2004, Chiu and Liaw, 2009, Paeleman and Vanacker, 2015). Examining the interaction between slack and firm performance (Bradley et al., 2011b) has led to several contradictory and conflicting outcomes.

The observed effect of resource-flexibility and operationalization of resource-commitments has a potential to stir controversy on firm performance and competitive advantage (Autry et al., 2005, Kulkarni and Ramamoorthy, 2005, Neelankavil and Alaganar, 2003, Mishina et al., 2004). However, empirically, as mentioned earlier, corresponding concepts to adaptational slack (e.g., concept of invested and generated slack) were investigated. (Autry et al., 2005, Dolmans et al., 2014). Furthermore, in theory, operating and strategic slack are situated at opposite end of a spectrum, reflecting the range of alternatives uses slack may serve (Sanchez, 1995, Singh, 1986, Tan and Peng, 2003).

Figure 3.7 shows the slack allocation process and adaptational slack matrix. Figure 3.7 also summarizes the four distinct slack characteristics based on diverse levels of operating and strategic slack resources. Some firms may have the characteristic of ‘slack ambidexterity, that is, possessing, both operating and strategic slacks (quadrant III). This quadrant also shows firms’ *resource ambidexterity*. In contrast, other firms may have the characteristic of ‘scarce slack’, that is, too little or lacking both strategic slack and operating slack (quadrant II). Firms may only focus on a single dimension of adaptational slack (i.e., concentrating on either strategic slack or operating slack).

For example, operations may be recognised by a configuration of ‘resource commitment’ which suggests commitment to a particular resource tactic, but deficient in operational slack in another. Two disparate kinds of slack-focused exist in this study: ‘*strategic slack focused*’ (quadrant I), which means that firms combine similar characteristics of slack under the strategic slack, reflecting commitments in strategic resources; and ‘*operating slack focused*’ (quadrant VI), which means companies uniting slack in operating slack with amassing flexible assets.

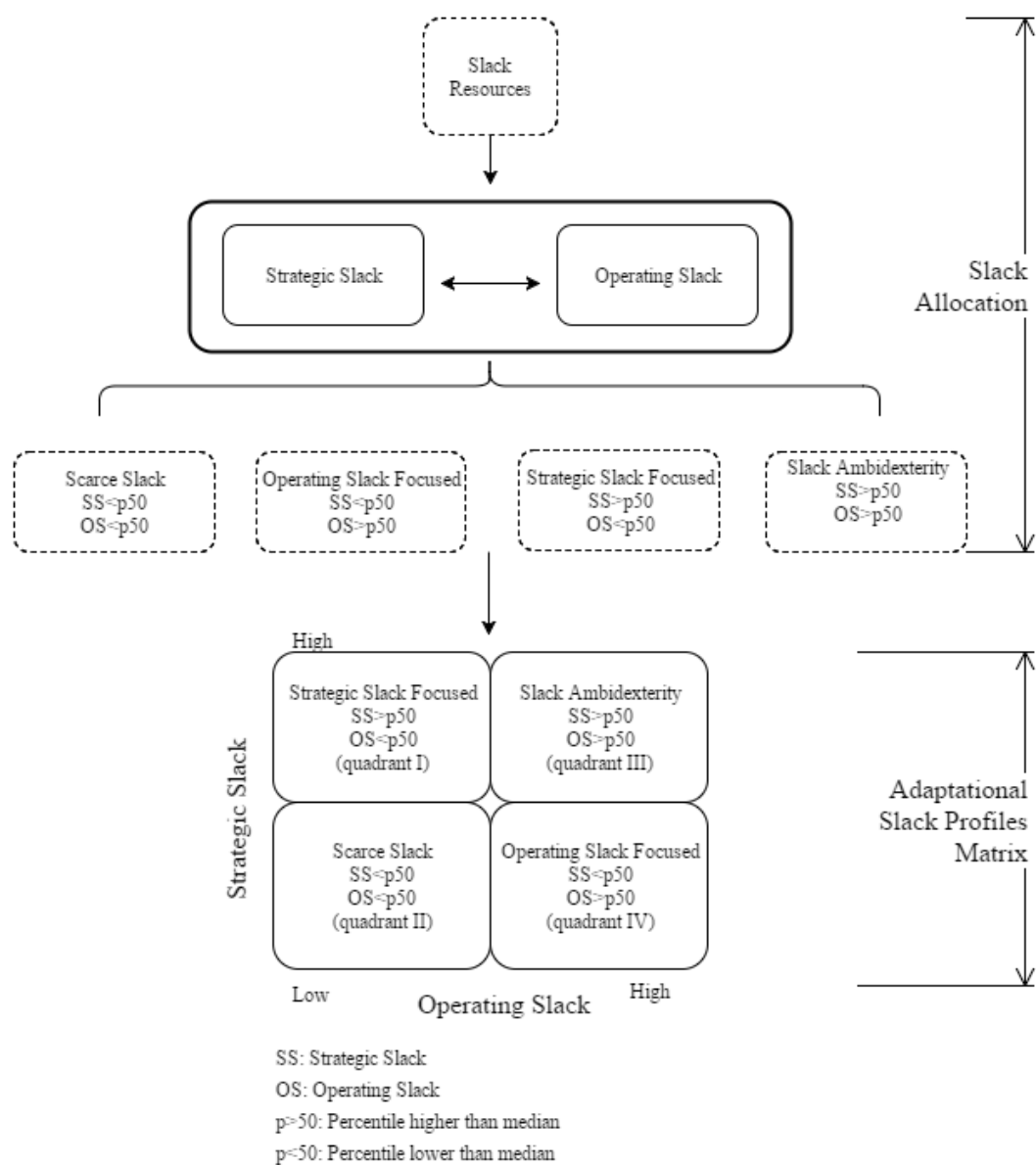


Figure 3-7 - Slack allocation framework and adaptational slack matrix

Companies are likely to find any of the four quadrants demonstrated in Figure 3.7. The finding was supported by two main rationales. First, earlier studies showed how firms distinguish themselves significantly depending on early resources endowments (Wilson and Amine, 2009). Some firms may have stocked excessive slack resources from their routines (Barney, 1991, Brinckmann et al., 2016, Bromiley and Rau, 2016), whereas other firms are highly committed. Second, previous studies indicate that companies with a superior level of slack in one kind of *'adaptational slack'* do not always have slack in other kinds of slack.

Due to different environmental demands before, during and after financial crisis, empirically, connections between various forms of slack could be various (Voss et al., 2008, Bradley et al., 2011b). As a result, the given level of slack can be various in different time periods. Firms use these different level of slack resources to improve efficiency and effectiveness of organization (Du et al., 2014, Gral, 2013, Greenley and Oktemgil, 1998, Guha, 2016).

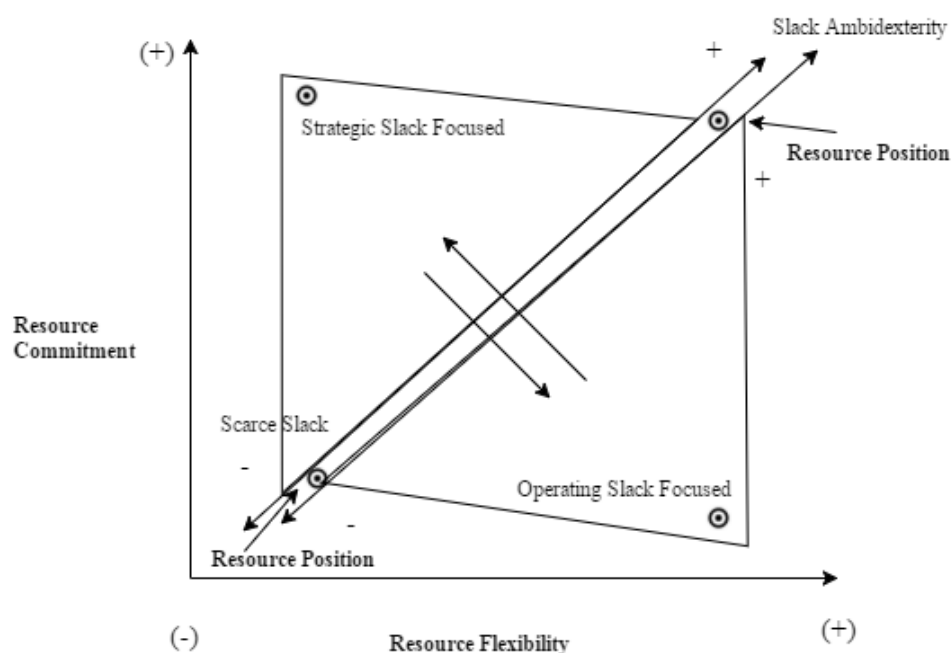


Figure 3-8 - Resource Position of Firms

Resource position shows perceived resource-flexibility, which arises from the range of prospective or actual operating slack resources, related to perceived resource commitment (Dolmans et al., 2014, Mishina et al., 2004). At the end of each continuum, firms experience either financial constraint (scarce slack) due to resource-commitment and low level of flexible resource or slack ambidexterity (slack abundance) through higher level of committed slack and flexible slack resources (Chiu and Liaw, 2009, Paeleman and Vanacker, 2015), which illustrated in figure 3.8. However, resource positions can shift depending on firm characteristics, environmental conditions and risk-attitudes (Levinthal and Marino, 2015, Mosakowski, 2002, Tversky and Kahneman, 1991).

Accordingly, the adaptation process is a successfully implementation of slack in a changing environment. While resource position impacts the adaptation process, resource-flexibility as proxy to alignment and resource-commitment as proxy to adaptability can produce mixed findings. Slack can feed firm adaptability, by promoting risk-taking and creating strategic options (O'Brien, 2003, Sanchez, 1993).

In this regard, excessive resources facilitate internal controls and enables to commit multiple investments resources while allowing firms for the surviving and the growth (Azadegan et al., 2013a, Bradley et al., 2011a, Guha, 2016, Paeleman and Vanacker, 2015). However, the state of possessing 'slack ambidexterity (slack abundance)' may be less stimulated firms to exploration activities, because the current routines can lead to rigidity in the organization and limit their exploration projects (Mishina et al., 2004). Conversely, resource-commitment may increase creativity (Kulkarni and Ramamoorthy, 2005, Li and Li, 2010) and encourage technological developments (Hoegl et al., 2010).

From the perspective of resource position, the level of slack can be a determination factor for firms when interacting with their environments. Because of its buffering effect during the environmental shocks, slack resources can play a catalyst role (Chakrabarti, 2015, Bradley, 2007, Bradley et al., 2011b, Wan and Yiu, 2009), especially more resources flexible enable firms to adapt environmental changes (Combs et al., 2011, Ben et al., 2016, Kraatz and Zajac, 2001).

On the other hand, Figure 3.9 represents an input-process-output model, which was suggested by Van de Ven (1992). Excessive and specific firm resources may use to formulate and implement and the process of adaptational change (Van de Ven, 1992, Chakravarthy, 1982) in an organization. The structure of the adaptation process research is various and cannot be pertained to a single paradigm. Researchers has employed different perspectives of adaptation process overtime (Sanchez, 1995, Porter, 1980, Chakravarthy, 1986) such as Chakravarty (1986)'s process of adaptation. Multiple 'process models, that have been suggested that the term 'process' is operationalized differently (Van de Ven, 1992).

The term 'process' refers to an arrangement of actions that outlines how things alter with time or that characterizes a fundamental "pattern of cognitive transitions by an entity in dealing with an issue" (Van de Ven, 1992):170). The model indicates a causal interaction between measured predictor (input) and predicted (outcome) variables. In this approach, 'process' is not directly measured. Instead, a 'sequence of activities' or reasoning is employed to indicate why a dependent (input) variable exercises a causal effect on an independent (outcome) variable (Van de Ven, 1992).

For example, to explain to what extent slack affects firm performance when environmental changes occur. Figure 3.9 demonstrates different dimensions of slack-performance relationship in terms of an input-process-output model. Indeed, slack management specifies a mutually complementary process, which includes slack profiles and adaptation profiles.

The level of slack and its corresponding adaptational behaviour are influential so as to determine firms' performance profiles. As demonstrated in figure 3.9, each mutual collaboration push firms towards each corresponding performance profile. Collaboration of slack and adaptation profiles drive firms towards corresponding performance profile. For example, slack ambidexterity can be attributed to ambidextrous firm strategies.

If a firm pursue ambidextrous firm strategy, it is most likely to achieve profitability as performance outcome (*slack management (IV)*). If a firm focuses more on generating strategic slack rather than operating slack, this signals that the firm pursues an adaptability-oriented strategy and it is most likely to achieve survival in the face of environmental mis-fit (*slack management (III)*).

Conversely, if a firm concentrates more on operating slack, then it is most likely to achieve firm growth as performance outcome (*slack management (II)*). However, scarce slack profiles signify existing of Ambinistrrious strategies that result in organizational fail (*slack management (I)*).

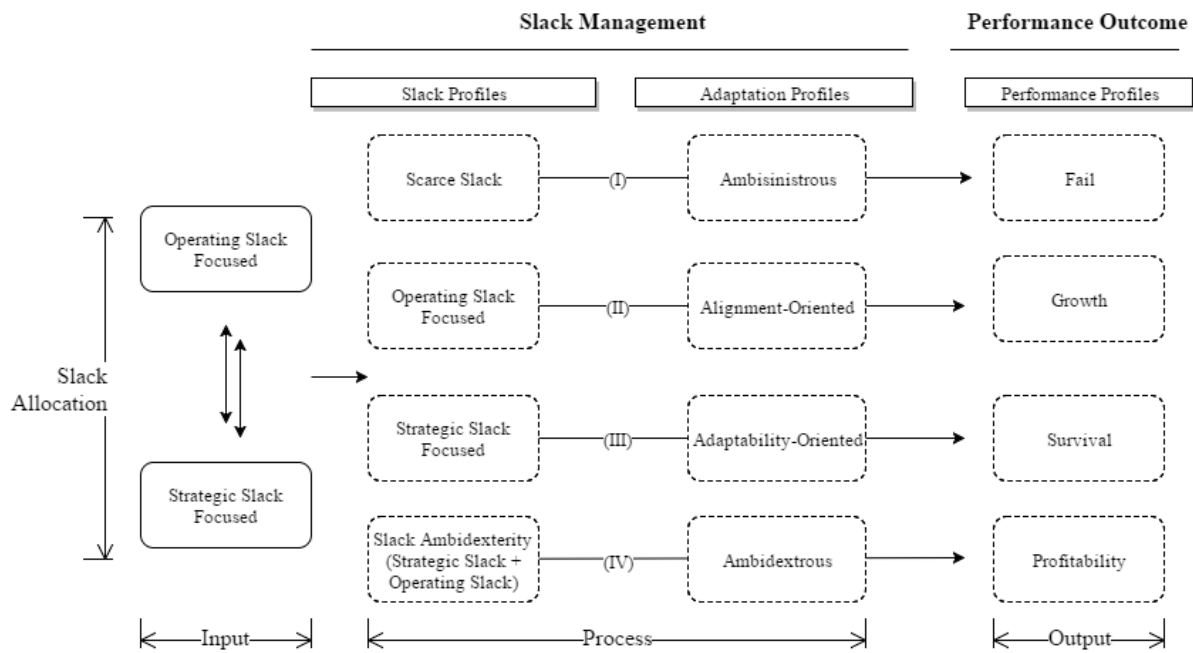


Figure 3-9 - Input-process-output model

The concept of adaptational slack provides firms with a new and powerful, but temporal tool for firm survival in a turbulent environment. It also shows managers how to adapt to a new environment by indicating change level of their firm-specific resources and resource characteristics in such an environment. Furthermore, the concept of strategic slack synthesizes several hitherto unrelated but widely used tools and techniques (Mizutani and Nakamura, 2014).

Therefore, it offers decision-makers a coherent framework for thinking about their firms' long-term direction. Adaptation process can be defined as a *manoeuvre* (Evans, 1991, Greenley and Oktemgil, 1998). By *manoeuvre*, is meant that the firm's freedom to change its resource position under different environmental conditions (Lele, 1992).

If a firm can change the level of its strategic and operating slacks simultaneously or sequentially then, by definition, the firm's strategic adaptational behaviour changes strongly or in the reverse direction. However, a firm can change its relative resources position in an environment in any one of ten factor dimensions for adaptational slack.

In practice, however, a firm's freedom to change its resource position, its *freedom of manoeuvre*, varies substantially along these ten dimensions for both constructs. How much freedom a firm has depends on the level of the particular resource. The adaptation for any changes in relative slack preferences (*manoeuvres*) also vary considerably, depending on the level of firm resources and environmental conditions.

A thorough understanding of adaptational slack is absolutely essential if a firm is to survive in an environmental turbulence. In the short run, ignorance about insufficient slack resources may create only minor problems. However, over the long term, such ignorance is dangerous for future survival (Orlando et al., 2016, Stan et al., 2014, Wang et al., 2016b).

The importance of the adaptation process can be summarized in two ways: first and foremost, generating slack resources in a stable environment and then investing these resources in the correct way is central to the choice of strategy during an unstable environment (crisis period). Secondly, using adaptation processes interchangeably adds value to the firm performance. Overall, it is clear that possessing sufficient slack resources is central to strategy decisions.

A comprehensive knowledge of adaptation process is essential for determining which tactics and strategies are feasible, which objectives are attainable, what resources are necessary, and how to employ these resources in a changing environment. For example, identifying feasible tactics and strategies are important to systematically analyse firm's *manoeuvre* – its freedom to change its position relative to resources – in all ten dimensions (Lele, 1992).

This describes specific changes or tactical moves that are not feasible due to resource constrain imposed by environmental changes, such as financial shocks. A brief characteristic of each quadrant is discussed next.



### 3.2.3. Adaptational Profiles

#### 3.2.3.1. *Ambinistrrious Profile*

*(Quadrant I) - Low Operating Slack / Low Strategic Slack*

These types of firms are unstable organisations because they do not possess operating or accumulated slack that allows them to invest and improve their adaptability for future contingencies. Frequently such organisations fall into unpleasant vicious cycle of responding inappropriately to their current environmental issues as well as failing to exploit their environments both efficiently and/ or effectively consequently lacking adequate slack or inability to invest effectively for the future (DeFeis, 2015, DeSarbo et al., 2005).

These firms mostly follow a slow adaptation-process, changing through a series of reactive rather than proactive, small, incremental steps during the sudden environmental changes. Further, they delay their responses, force into less proactive responses to financial crisis. Being an Ambinistrrious would mean a non-competitive advantage and a low level of resource capability.

Firms will find themselves in this situation if they fail to develop one of the adaptation process successfully (Miller and Dess, 1993). Put differently, any combination that places a distinct stress on none of the adaptation processes can be regarded as “ambinisterity”, as it does not manage to show success in anything. They are in an extremely poor resource position and are more or less guaranteed low performance. Ambinistrrious firms have ill-conceived strategies that leads to misalignment and incompatibility with their environments because they lack of ability to manage properly to use choice of resource flexibility/commitment (Autry et al., 2005, Dolmans et al., 2014).

Length and duration of financial crisis also influence them severely due to uncertainty in their resource position (Reinhart and Rogoff, 2011, Zheng and Yanjun, 2010, Bradley et al., 2011b). Therefore, ambidexterity oriented strategies are expected to lead to lower level of profitability before, during and after the financial crisis.

### 3.2.3.2. *Alignment – Oriented Profile*

#### *(Quadrant II) - High Operating Slack / Low Strategic Slack*

This quadrant represents the situation wherein an organisation is successfully aligned with its internal and external environments via adaptive specialisation resulting in higher levels of operating slack. Since the organisation is not threatened by its current environment, it sees no benefit in risking investment of slack resources through adaptive generalization.

In fact, strategic slack resources to adapt future environments is not seen as the ultimate organisational objective since the already generated slack can frequently give short-term cover from coming environmental modifications to operations that own them. (Selznick, 1957, Miles and Cameron, 1982, Galbraith, 1973, Pondy, 1967, Thompson, 1967, Tan and Peng, 2003).

Moreover, it can be further argued that organizations that are successfully aligned to their environments before the crisis possess firm specific competences and resources, not adjusting to environmental shifts during a time of crisis may not endanger the position in the market of such resource-rich firms in the first instance (Kraatz and Zajac, 2001, Barney, 1991, Dierickx and Cool, 1989).

However accumulated slack resources restrict future investment of these resources by uncoupling the organisation and its environment temporarily, organizations may be rendered passive and deadening decision makers to coming exigencies (Mishina et al., 2004).

As Kraatz and Zajac (2001):634) stated “organizations with accumulated slack resources are less likely to experience a sense of urgency regarding adaptation to future crisis and more likely to perceive an increased (perhaps false) sense of certainty about the future”.

### 3.2.3.3. *Adaptability-Oriented Profile*

#### *(Quadrant III) - Low Operating Slack / High strategic Slack*

This quadrant represents the situation wherein an organisation proactively invests its slack resources *ex- ante* through adaptive generalization, towards enhancing capacities in order to adjust to precarious and unexpected future events (Greenley and Oktemgil, 1998, Evans, 1991, Sanchez, 1995, Volberda, 1996, Brinckmann et al., 2016, Brozovic, 2016). The experience of adaptive generalization therefore demands that an old alignment be deliberately disturbed for the sake of a new and higher fit by investing to create future options. These future options are then to be exercised to manage during and after crisis contingencies.

While investing slack resources through adaptive generalization before the crisis may ensure organization's long-term survival during or after the crisis, its quest may undermine temporarily its financial success and lead to low levels of '*operating slack*' (Chakravarthy, 1981). For example, a firm investing slack resources in R&D expenditures to create future options may reveal lesser financial success than a competitor that has not embraced R&D investment to the same extent (Chakravarthy, 1986, Chakravarthy, 1982).

Similarly, ex-ante high slack investment may be associated with (temporary) firm level inefficiency or lower levels of cash availability since the firm foregoes keeping slack at the expense of paying dividends as well as making R&D investments. Despite these limitations, devising ex ante options prior to their deployment has two dividends: one, its actual value, and two, the competency base actualized in pursuance of other substitutes. (Evans, 1991). From the real option perspective creating variety of ex-ante options, provides the organisation versatility to exercise these options during crisis stages. The behaviour of firms in this quadrant rests with the premise of Penrose and others.

#### 3.2.3.4. *Ambidextrous Profile*

##### *(Quadrant IV) - High Operating Slack/ High Strategic Slack*

Operations in this quadrant seek a harmonious course of action by investing steadily in slack in order to create future choices, while at the same time restocking the strategic slack resources periodically. Such organizations follow the twin paths of '*adaptive specialization*' and '*adaptive generalization*' *simultaneously*. (Chakravarthy 1986). Firms with such adaptation behaviour are basically acting in accord with the recommendations of organisational ambidexterity perspective of adaptation (Goossen and Bazazzian, 2012, Venkatraman et al., 2007).

This indicates the firm's aptitude to pursue high alignment with the current environment by generating higher levels of slack and at the same time high adaptability provision for future unknown environments by investing more in slack. The principal dissimilarity between this quadrant and the adaptability-oriented profile is that firms here achieve an equilibrium between two diverse (and occasionally conflicting) goals.

This necessitates an efficacious compromise to profit from distinct dynamisms of both operating and strategic slack. This perspective tends to view organizations as continually striving to dynamically balancing short and long term needs with changing environmental contexts (Zajac et al., 2000) resulting in performance benefits. Earlier behavioural theorists argue that achieving one's goals breeds slack, which neutralises the issues of scarcity and generates a source of funding for investments that might not normally be accepted in a situation of shortage (Cyert and March, 1963, Bourgeois, 1980).

### 3.3. Hypotheses Development

#### 3.3.1. Slack-Performance Relationship

Several factors were identified by the supporters of slack (Chiu and Liaw, 2009). Firstly, RBV suggests that idle and unexploited slack resources can leverage strategic capabilities and increase profit potential of firms in order to use unexpected opportunities, thereby fuelling firm survive and growth (Nohria and Gulati, 1997, Penrose, 1959, Azadegan et al., 2013a). Secondly, BTF suggests that excess resources are positively associated with risk-taking and exploration activities, thereby facilitating experimentation and innovation (Bourgeois III and Eisenhardt, 1988, Nohria and Gulati, 1995, Nohria and Gulati, 1997).

Thirdly, BTF also suggests that slack increases firms' ability to act as a buffer to sudden environmental shifts, improve adaptation of firm to new industrial settings and thereby increasing future performance (Paeleman and Vanacker, 2015, Wang et al., 2016b). Viewed from this point, firms isolate their competitive advantages with input and output buffers (Barney, 1991, Nandakumar et al., 2014, Reeves and Deimler, 2011). During the environmental jolts, the adaptation process can resort to these buffers and cushions, and thereby facilitating temporary changes (Wright and Snell, 1998, Meyer, 1982, Wan and Yiu, 2009, Agarwal et al., 2009).

Fourthly, BTF considers organizations as a whole (Cyert and March, 1963). Organizational groups of members may consider organizational problems in a different way, leading to conflicting operational goals. Fifthly, when resources are limited in business environment, organizational members make efforts to form organizational groups to come to an agreement for limited resources. However, resource abundance provides less political dependence.

Finally, however, Prospect theory suggests that low performance stimulates to increase risk-taking activities (Zona, 2012). In case of environmental threat, the association between slack and performance is expected to become more positive (Voss et al., 2008). These three theories that represent positive views in question agree that slack is a source of flexibility (Greenley and Oktemgil, 1998). They advocate that more slack means greater firm performance in a turbulent environment (Chiu and Liaw, 2009, Mosakowski, 2002).

**Hypothesis 1a:** *There will be multiple positive interactions among different forms of slack and performance variable before, during and after financial crisis.*

On the other hand, apart from these positive views, several researches advocate that excess resources lead to inefficiency. Resource constraint theory, agency theory, and threat rigidity theory identify slack as a source of risk and inflexibility (Jensen and Meckling, 1976, Dolmans et al., 2014).

Firstly, according to RCT, firms with limited slack are expected to utilize their resources more efficiently (Chiu and Liaw, 2009). Firms make effort to find new ways to leverage and extend their resource reserves to become more flexible and more adaptable, thereby increasing their profitability (George, 2005).

Secondly, proponents of the agency theory advocates parallel arguments regarding excess resources. According to this view, slack is seen as a source of potential agency problem and resource misallocation (Dutta et al., 2016, Zona, 2012). Firms with resource flexibility may be tempted to invest in new slack resources rather than distributing dividends to shareholders.

Similarly, over-commitment may harm firm performance due to the possession of excessive slack resources, which facilitate the pursuit of self-serving interests for managers that can change long-term performance expectations (Autry et al., 2005, Petersen and Pedersen, 1999, Dolmans et al., 2014).

Thirdly, in similar vein, TRT suggests that firms may become rigid when faced with environmental threats (Wan and Yiu, 2009). In this case, declines in level of firm performance inhibits risk-taking activities and, hence limits usage of slack, organizational change and adaptation (Latham and Braun, 2009a). The optimal level of excess resources is markedly limited due to these negative factors (Geoffrey and Nohria, 2005).

Fourthly, a zeroing process of slack, however, can be deceptive: holding a certain amount of slack resources is necessary for daily routines in the organizations and this level of slack should not be eliminated for the sake of organizational continuity (Chen and Chuang, 2009, Harford et al., 2012, Chen and Huang, 2010, Cheng and Kesner, 1997).

In response to these different views, this study aims at investigating the interaction of slack-performance before, during and after financial crisis. In addition, it is expected to observe negative consequences of financial crisis on firm performance. Therefore,

**Hypothesis 1b:** *There will be multiple negative interactions among different form of slack and performance variable before, during and after financial crisis.*

Resource based theory suggests that uniqueness of certain resources are the basis for and facilitate the implementation of firm strategy. Therefore, different forms of slack resources may inherently have different implications on firm performance in different environmental conditions. In addition, strategic options, specific forms of slack, are optional investments in which they provide organizations with the ability to undertake various future activity by selecting whether to invest at before financial crisis to prepare for potential uncertainty during and after financial crisis (Trigeorgis and Reuer, 2016, Meier et al., 2013, Reinhart and Rogoff, 2011). RBV suggests that investing in various slack forms provides strategic options for firms before financial crisis.

According to BTF, these options provide a range of future opportunities after a crisis (Meyer et al., 1990, Wan and Yiu, 2009) to improve firms' current capabilities or change with alternative ones while reducing risk factors and switching costs for initial investment. Hence, accumulating slack before financial crisis enables firms to adapt more easily to new environmental conditions through maintaining flexibility (Brinckmann et al., 2016, Kortmann et al., 2014). However, prospect theory suggests that a perceived performance declines may stimulate level of risk-taking and experimentations (Shimizu, 2007, Shimizu and Hitt, 2004). Reducing the level of slack will increase firm innovation and thus firm performance.

Therefore, related hypotheses were proposed as follows:

**Hypothesis 2a:** Pre-crisis slack resources have a significant relationship with post-crisis performance.

When faced with environmental turbulence, acquiring and assimilating resources as strategic options enhances a variety of possible responses to the changes in environment, whether the changes bring opportunities or threats (Gunther and Nerkar, 2004). Thus, while strategic options may not be very important during the resource constraint environment, they have an importance because they assist in adapting to new environmental conditions through the flexibility that they provide (Brozovic, 2016).

Research suggests that operating slack variables are an important source of flexibility and, as investing operating slack can improve existing adaptation, and increase adaptation efficiency. Therefore, pre-crisis resource flexibility through operating slack variables allow firms to regain alignment with new environment through the adaptability process, post-crisis and more rapidly.

Therefore, related hypotheses were proposed as follows:

**Hypothesis 2b:** Pre-crisis slack resources have not a significant relationship with post-crisis performance.



By combining four hypotheses, Figure 3.10 illustrates pre-crisis resources impacts on post-crisis firm performance.

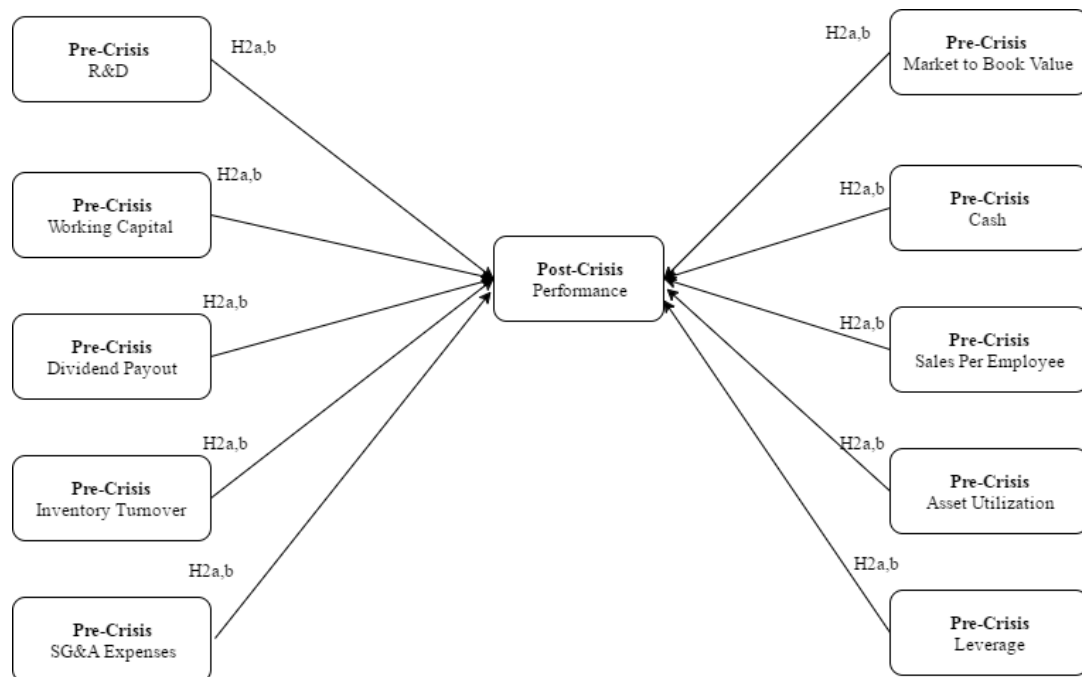


Figure 3-10 - Diagram for pre-crisis resources impacts on post-crisis firm performance.

### 3.3.2. Adaptation Process

Literature investigates how managers navigate the tension between exploitation of existing knowledge and exploration of future opportunities. While exploration is dealing with long-term and future-oriented opportunities, exploitation focuses on short-term and present-oriented activities (Smith et al., 2017). Because firm resources face various demands, particularly temporal demands, past studies anticipated that managers must make a decision on exploitation and exploration strategies. However, recent studies showed that there is a paradox to demonstrate how firms can manage both exploration and exploitation simultaneously or sequentially (Raisch et al., 2009, Bandeira et al., 2016).

According to BTF perspective, this paradox is crucial for explanations of a wide range of organizational behaviours (Posen et al., 2017). For example, some scholars suggested that managers could develop a business capability that enables firms to simultaneously allocate resources and time to both processes of adaptability and alignment (Bandeira et al., 2016, Birkinshaw and Gupta, 2013, Gibson and Birkinshaw, 2004). Firms in a highly turbulent environment should pursue exploitation and exploration strategies and address conflicting demand for adaptability and alignment (Belak and Duh, 2017).

The formulating of adaptation process begins with '*adaptation generalization*' that enables an organization to improve its adaptive abilities and to plan suitable adaptation strategies for environmental changes. An organization's success in uncertainty results from the resource capability and adaptation capacity. Such organizational characteristics can be created by an organization's '*adaptive specialization*' – the right choice between adaptation processes (adaptability) and *resource flexibility/commitment options (commitment)* (Dolmans et al., 2014).

A firm that aligns with its environment by formulating a relevant adaptation process will be able to create a stable environment and thus generate profits for future survival. Such profits can be characterized by organizational slack resources. Adaptation is an ongoing process where organizations postulate major decisions that will maintain the alignment effectively with their environment.

Whereas ‘adaptive specialization’ is the manner in which good matching is augmented in a given condition, adaptive generalization improves firms’ survivability (Chakravarthy, 1986, Chakravarthy, 1982, Greenley and Oktemgil, 1998). Viewing from Chakravarthy (1982)’ perspective, to operationalize adaptation, ‘*adaptive generalization*’ and ‘*adaptive specialization*’ as sub-processes should be clearly distinguished if exist such distinction among the firms. Organizational ambidexterity is generally recognized to increase firm performance (Enke, 2017). In consistent with Liu and Hsu (2016), this study examines the effect of being ambidextrous on the relationship between slack and performance.

It is expected that both adaptation processes have a positive impact on firm performance. Thus,

**Hypothesis 3a:** Alignment and adaptability are distinct dimensions of an adaptation process.

**Hypothesis 3b:** Adaptability is positively associated with firm performance.

**Hypothesis 3c:** Alignment is positively associated with firm performance.

### 3.3.3. Adaptation Profiles

According to the RBV perspective, organizational value is achieved only when firm resources are used properly depends on environmental conditions. Hence, managers must use their resources dynamically because exploiting opportunities will results from adaptation to environmental contingencies. The environmental shocks force firms to design and adopt new adaptation strategies in order to exploit its ongoing resources (Tognazzo et al., 2016).

Slack resources *'provide the flexibility necessary to adapt resource allocation levels as projects progress over time'*, and *'facilitate adaptation to the ebbs and flows of the innovation process'* (Nohira and Gulati, 1996:1249). Therefore, as pointed out Zona (2012), behavioural theory and prospect theory suggest that slack resources enable managers to invest in risky projects in the face of uncertainty.

Firms with higher levels of slack and higher adaptation capacity seem to perform better than firms with lesser slack and adaptation capacity, in general (Chiu and Liaw, 2009, Mosakowski, 2002). However, several studies also argue that organizations are always prepared to adapt to environmental changes, which can be measured through slack resources (Bradley et al., 2011b, Meyer, 1982).

The presence of surplus resources enables firms to adapt to environmental changes, while increases in level of slack provide firms with a chance to boost their adaptation readiness (Huang and Chen, 2010, Jalilvand and Kim, 2013). Therefore, slack resources can be used as an internal response factor in order to measure impacts of environmental changes on firm performance. RBV has suggested a possible relationship between slack and adaptation capacity (Ben et al., 2016, Jalilvand and Kim, 2013, Koberg, 1987). This relationship varies when firms have a different form and level of slack resources. Therefore, firms with different form and level of slack have different level of performance outcome. Therefore,

**Hypothesis 4a:** Different adaptation profiles have different level of slack with varying performance implications.

Companies with good levels of adaptiveness will demonstrate more slack assets than entities with low levels (Chakravarthy, 1986, Chakravarthy, 1982, Bourgeois, 1980, Bandeira et al., 2016), which implies ambidextrous firms exhibit more slack resources than other adaptation profiles. Ambidexterity profile implies capability of reinvesting or exploring new opportunities through adaptability process as well as exploiting existing resources through alignment process with equal dexterity (Junni et al., 2013, Josephson et al., 2015, Kortmann, 2015, Kortmann et al., 2014). In addition, the mechanism of ambidexterity relies on balancing the alignment and adaptability process either simultaneously or sequentially. Superior firm performance is expected from ambidextrous firms. Ambidextrous firms use higher level of operating slack and strategic slack by balancing alignment and adaptability. Therefore,

**Hypothesis 4b:** Firms with the highest firm performance will exhibit ambidextrous profile

Process of adaptability is related to exploration because exploration strategy includes several related concepts such as flexibility, innovation and risk-taking (Lee et al., 2017, Tang and Richter, 2017). Adaptability-oriented profiles imply increased management alertness towards capitalizing on emerging changes and unexpected opportunities (Evans, 1991, Bahrami and Evans, 2005). Adaptability also assists firms to improve the future conditions and to seize the opportunities that are generated by alignment-oriented strategies (Sanchez, 1997, Oriani and Sobrero, 2008, Meier et al., 2013, Sternad et al., 2011).

Furthermore, it is expected from firms pursuing an adaptability-oriented strategy that using existing technology more competitively than alignment-oriented and Ambidextrous profiles. Adaptability indicates organizational ability to handle shifting demands in the uncertain circumstances.

In general,

*“.....adaptability is an organization’s collective ability to effectively adjust, mobilize and reconfigure internal resources, activities and processes to address the changing demands from its external environment.” (Huang et al., 2015):52).*

Adaptability implies the sense of flexibility toward changes (Lee et al., 2017). Adaptability depends mostly on operating slack resources that are available within the organization. These firms use operating resources to future survival by investing in strategic slack resources. As a result of this, firms with adaptability-oriented strategy can be expected to possess greater level of strategy slack and lower level of operating slack resources. High performer firms are expected to have higher adaptability. Therefore,

**Hypothesis 4c:** Firms with the highest firm performance will exhibit adaptability-oriented profile

Conversely, exploitation is associated with productivity and efficiency for existing routines. Thus, as Lee et al. (2017) suggested, process of alignment is related to exploitation. Alignment-oriented strategies enable a firm to capitalize potential future opportunities and survive. It is most useful adaptation strategy in which future is unforeseen and in which innovation is regarded as a competitive weapon for competition in market (Chen and Huang, 2010, Chen, 2015b, Weigelt and Sarkar, 2012). These strategies also can be seen as a prerequisite for achieving strategic flexibility (Levy and Powell, 2004, Junni et al., 2015). Alignment strategies provide firms to create a range of strategic options that include predicting customer expectations and to some extent evolving market margins (Josephson et al., 2015, Klingebiel and Adner, 2015) for during and after financial crisis.

Alignment strategies contains pre-emptive manoeuvres as a proactive action taken before the crisis (Evans, 1991). It enables to exploit potential future gains for firms (Volberda and Elfring, 2001, Cui et al., 2016). Put differently, alignment includes a number of future options that provides adaptability against changing environment (Levy and Powell, 2004). Huang et al. (2015):52) suggested that

*“alignment refers to the level of coherence between an organization’s strategic goals and the activities that are performed to actualize these goals.”*

Alignment also refers to “*excellence in daily operations*” (Bodwell and Chermack, 2010). Firms concentrate on generating operational resources during the stable environment rather than strategic slack. Therefore, firms with alignment strategies are most likely to possess larger level of operating slack and lower level of strategic slack resources. Due to possessing excessive operating slack, it is expected that they cannot be like firms that pursue adaptability strategy. Therefore, the hypothesis should be as follows;

**Hypothesis 4d:** Firms with the highest firm performance will exhibit alignment-oriented profile

Ambisinistrous strategies refer to lack of consistency in strategic choices. Ambisinistrous firms perform comparatively poorly in an uncertain environment. These firms “*are unable to respond effectively*” and “*seldom make adjustment of any sort until forced to do so by environmental pressures*” (Miles et al., 1978):29). Therefore, ambisinistrous firms are probably in a worse position compared to other adaptation profiles.

Ambisinistrous oriented strategies represent inconsistency due to either adherence to existing strategies that are no longer apt for a new environmental condition or lack of a viable strategy (DeFeis, 2015, DeSarbo et al., 2005, Sollosy et al., 2015). As a result of this, ambisinistrous firms are expected to possess limited organizational slack.

Such conditions can lead to a number of significant difficulties during the financial crisis such having a very low firm performance. External pressure may create negative effects on ambisinistrous firms. Therefore, it is expected that:

**Hypothesis 4e:** Firms with the lowest firm performance will exhibit ambisinistrous profile

Adaptation Slack, Financial Crisis and Curvilinear Relationship

### 3.3.3.1. *Impact of Financial Crisis*

In discussing the impact of financial crisis on firms, Meyer (1982) developed a three-phase model of organisational adaptation which indicated that adaptations to jolts are when the negative news may be obvious, ‘anticipatory phase’ ( pre-crisis ) when the first effects are being felt, and ‘responsive phase’ (during the crisis) when the worst has abated. In the ‘readjustment phase’ ( after crisis ), while it may not be feasible to stop the next occurrence or reorganise the firm to prepare for the next event, firms can still prepare for future crisis either by accumulating slack as buffers and/ or invest slack resources to create options or capability base for future contingencies. The former move can make the organisations more passive and the latter more proactive (Kraatz and Zajac, 2001) towards responding future crisis. In the ‘*responsive phase*’ (*during crisis*), the market experiences a sudden, important, but short-lived trauma.

Therefore attempts to achieve permanent alignment with the crisis environment through adaptive specialisation maybe impossible as this new environmental state may require successive, temporary but continues "fit" by practicing *flexibility* (Starbuck et al., 1978). It is widely recognized that strategic flexibility is a key strategic dimension of a firm's response to turbulent environments (Chen, 2015b, Brozovic, 2016). Firms may require different forms of flexibility to manage the “during crisis “stage because of the multidimensional state of the crisis environment (Kraatz and Zajac, 2001).



On the other hand, researches within financial and strategic management suggest that easily convertible slack resources and sufficient market opportunities are specifically important to a firm's performance during the environmental turbulence (Lee et al., 2009, Ma et al., 2014, Meier et al., 2013, Reinhart and Rogoff, 2011, Wan and Yiu, 2009).

This assessment is specified that environmental jolt mostly asserts large changes to the accumulated unabsorbed and some recoverable slack resources (Agarwal et al., 2009, Arslan et al., 2014). Accumulating higher level of slack resources for potential future needs during the financial crisis makes slack an important factor for firms.

Slack resources that are not unique by themselves may enable firms to acquire available slack resources such as by generating cash (could be either internal or external) and improving market value<sup>112</sup> (Grüner and Raastad, 2015, Latham and Braun, 2008). Excess resources are suggested to be evident during crisis, as slack buffers the effect of uncertainty and enable to seize new opportunities when they are available.

Wan and Yiu (2009) suggested that firms with unabsorbed (e.g., operating slack) slack is positively associated with firm performance during crisis. In general, although past empirical studies on slack during the financial crisis is quite limited, it is anticipated that various forms and levels of pre-crisis slack have positive implications on during performance (Grüner and Raastad, 2015).

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<sup>112</sup> In addition, Cheng and Kesner (1997) argued that existence of excess resources make contribution to improve firm performance positively during the financial crisis.

However, operating slack brings positive effects on the firm performance as it facilitates alignment and improves the strategic choices. Operating slack implies resource availability and not only protect firms against unexpected changes, but provides also flexibility to overcome difficulties in current conjecture (Voss et al., 2008, Mizutani and Nakamura, 2014, Bahrami and Evans, 2005, Evans, 1991).

As operating slack is derived from underutilized resources, operating slack also enables risk-taking for firm operations. In the event of a financial crisis, operating slack is unabsorbed and mostly used to a specific purpose to investment that is relatively easy to reallocate to alternative uses (Soetanto and Jack, 2016b). In general, operating slack has two major goals, which have various implications on firm performance. Firstly, having a high level of operating slack may also provide solutions for current problems in organization. Of course, this is not case for unstable periods. In pre-crisis period, possessing high degree of operating slack shows firms' capabilities to exploit current opportunities (Soetanto and Jack, 2016b).

Secondly, operating slack provides resource-flexibility for firms to create strategic options and accordingly to use those resources for the sake of firm adaptability during the financial crisis. Conversely, lower level of operating slack may lead to organizational fail due to resource constraint. Slack indicates potential level of firm growth without resource constraint.

Overall, firms that adopt the notion of "adaptive generalization" are more likely to follow a routinized alignment strategy for daily operations and to be expected to achieve firm growth as performance outcome at the end of this process. Therefore, the following hypothesis was proposed:

**Hypothesis 5a:** The financial crisis has a negative impact on both firm performance and operating slack-performance relationship.

**Hypothesis 5b:** The financial crisis has a positive impact on both firm performance and operating slack-performance relationship.

### 3.3.3.2. Curvilinear Relationship

Excess resources enables firms to engage in adaptive as well as risk-taking behaviour, hence resulting in both advantageous and deleterious influences on performance (Nohria and Gulati, 1995, Tsai and Luan, 2016). In addition, slack does not only create both positive and negative implications on performance but also curvilinear effect such as an inverted U-shaped (Bourgeois, 1981, Tan, 2003).

Too little slack limits firm exploration activities such as R&D experiments, whereas excessive slack resources may minimize investment activities (Tyler and Caner, 2015, Lee, 2015). George (2005) found that the implication of excess resources on performance was positively associated, but excessive slack resources was harmful, meaning a nonlinear interaction between performance and slack.

Similarly, some scholars found that available slack and absorbed slack have an inverse parabolic impact on firm performance (Tan and Peng, 2003, Bradley et al., 2011b). Therefore, it was proposed that:

**Hypothesis 6a:** The relationship between slack and firm performance is curvilinear.

**Hypothesis 6b:** There is only either positive or negative linear relationship in between slack and firm performance.

#### 3.3.4. Environmental Munificence and Dynamism

Lim (2017) suggested that firms in a munificence environment are more likely to increase positive results of creating resources employed in risky projects, growth opportunities and thus firm performance. Furthermore, it is also expected that firms with higher level of cash flows or less probability of bankruptcy in such an environmental condition (Withers and Fitza, 2017). From RBV perspective, the adaptation may become more evident in high-munificent environment (Seth and Lee, 2017, Cuypers et al., 2017). However, from RCT perspective, type of adaptation may become more obvious in low-munificence environment.

Environmental munificence can be seen as the availability of potential slack that can provide better performance, future survival, and firm growth (Jifri et al., 2016, Bradley et al., 2011b). A munificence environment represents industry growth and opportunities that allow firms to generate firm resources by means of the accumulation of high excess resources (Walters et al., 2010). Munificence can enable incumbent firms to create a long-term adaptation strategy and investment routines (Koh et al., 2014, Chen, 2015b, Tilcsik, 2014). Past studies have shown empirically that slack management can enable firms to acquire financial performance by advancing exploration activities and operational efficiencies in a munificence environment (Dögl and Behnam, 2015).

An environmental situation with high munificence may be recognised by greater resource capability and adaptation capacity. In such an environment, firms mostly rely on greater executive discretionary powers to capitalize on a slack-based strategy (Lee, 2015). On the other hand, less munificence environments can indicate resource limitation, which aggravates crisis conditions for firms with fewer performance and growth opportunities. Negative engagement in process of adaptation can harm level of slack generated by environment-related reasons and thus firm performance.

In consequence, in a moderately munificent situation, a company is more liable to concentrate on slack production strategy to acquire a superior firm performance. Accordingly, the hypothesis was proposed as follows:

**Hypothesis 7a:** Environmental munificence positively influences slack-performance relationship.

**Hypothesis 7b:** Environmental munificence negatively influences slack-performance relationship.

*Environmental dynamism* means instability and randomness in the alterations inside the industries (Goll and Rasheed, 2004, Nadkarni and Chen, 2014). High level of dynamism in an industry may endanger a firm's survival due to lack of proper response capability with the necessary changes. Increasing environmental dynamism makes it more difficult for managers to consider generating slack resources to alleviate these contextual effects. It has been indicated that one way to deal with uncertainty is by enhancing its level of adaptability via committing current slack resources. When volatility characterized by environmental dynamism, decision-makers incline to adopt adaptability-oriented strategies to develop protection system.

Additionally, this volatility in industry may stimulate firms to take greater risks (McCarthy et al., 2010, Shimizu, 2007). Stability may lead to standardize routines, of which result in difficulties in increasing firm adaptability for new environment. Therefore, firms tend to concentrate more on routines rather than environmental innovation in a stationary environment (Van Uden et al., 2017). As a result, managers may facilitate resource commitment activities to mitigate the impact of environmental dynamism. As Zheng and Yu (2017) proposed that firms with organizational slack resources are more likely to position better to exploit opportunities in highly dynamic environment and thus better firm performance. Therefore, it was proposed the following:

**Hypothesis 8a:** Environmental dynamism positively influences slack-performance relationship.

**Hypothesis 8b:** Environmental dynamism negatively influences slack-performance relationship.

### 3.3.5. High Performer and Low Performer Firms Based on Risk-Taking Behaviours

Consistent with previous studies<sup>113</sup> (Eccles et al., 2014, Arslan et al., 2014), whether high performer and low performer firms are influenced by different form and level of slack resources were tested, Altman's Z-score was employed to separate firms as high performers and low performers. Z-score can be seen as a bundle of composite slack that including stock market factors, cash, and profitability (Altman, 1968, Chakravarthy, 1986, Short et al., 2007, Chakrabarti, 2015). Therefore, it can be said that there are two aspects of the z-score that comprising both performance and risk-taking behaviours (Bagozzi and Phillips, 1982, Chakravarthy, 1986, Lumpkin and Dess, 1996).

However, low performer firms<sup>114</sup> engage in relatively poor offensive risk-taking behaviours. Prospect theory suggest that performance distress could be an essential indicator of external threats and decrease in performance decline (Chattopadhyay et al., 2001, Kahneman and Tversky, 1979). According to prospect theory, therefore, low performer firms may pursue risk-seeking strategies.

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<sup>113</sup> Confirming the polymorphous, sophisticated structure of the performance, scholars have asserted that multiple indicators of performance should be used to understand more deeply the relationship between firms' risk-taking attitudes and performance (Bagozzi and Phillips, 1982, Lumpkin and Dess, 1996, Chakravarthy, 1986, Barreto, 2012, Zona, 2012). Indeed, risk-taking behaviours may lead to positive and negative results on performance (Lumpkin and Dess, 1996)). For example, proactive and offensive based firm strategies may enable a firm to gain quickly market opportunities during the uncertainty. However, such strategies may reduce short-term profitability due to heavily investments in R&D activities. The type and level of slack resources may shape firms' risk-taking behaviours.

<sup>114</sup> Ferrier et al. (2002) pointed out that low performance an any one implementation index does not give strong enough evidence regarding strategic objectives. They argued that low z-score indicates financial distress. The results of previous studies (Tsai and Luan, 2016, Arslan et al., 2014, Chakravarthy, 1986) are tally with the idea that high performer companies are liable to deploy risk-taking measures and contend actively.

They allocate their slack resources in order to pursue aggressive firm strategies through applying adaptability process. Thus, they can find a solution for temporary reactions to current crises. However, threat rigidity theory suggests managers may lessen their adaptability after a crisis and this may lead to low performance for firms (Greve, 2011, Shimizu, 2007). Performance distress can be expected to be lower in the conditions of environmental uncertainty or when resources in environment are very limited. Firms are most likely to invest less in slack when the adaptation cycle is unfavourable (during the financial crisis).

Investigating the relation between slack and risk-taking during and after financial crisis is relevant for two major reasons. First, the financial crisis offers a natural frame to analyse the major theories advanced in the organizational slack literature regarding slack and risk-taking. Second, slack affects risk-taking through its impact on idiosyncratic risk<sup>115</sup> such effect may be powerful during and after financial crisis. Specifically, slack-performance relationship can be influenced by that idiosyncratic risk during and after crisis. During the financial crisis, the average volatility raises. This increase could be moderate for risky firms after the crisis. The relationship between performance variable and financial distress (z-score) is ambiguous. Specifically, it was aspired to reveal the natural relationship between performance / post-crisis performance and financial distress. Thus, any significant findings found in the results may indicate that firms may pursue different risk-taking behaviours. Therefore, based on the prospector views as well as TRT relating to implications of risk on slack-performance relationship, the following hypotheses were developed:

**Hypothesis 9a:** Firms with higher financial distress will perform at a higher level, than firms with lower financial distress.

**Hypothesis 9b:** Post-crisis performance has a positive relationship with financial distress (z-score).

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<sup>115</sup> Slack influences risk-taking through its impact on idiosyncratic risk since the effects of slack and practices are idiosyncratic Bouslah et al. (2013).

### 3.3.6. Risk-Taking Capabilities

The direct implications of risk-taking behaviours on current and future slack-performance relationship is unclear<sup>116</sup> (Cyert and March, 1963, Bromiley, 1991). Although there are various studies on slack –performance relationship, none of them has written about the causal influence of risk-seeking attitudes on this relationship from the lens of organizational adaptation.

Firms with high level of slack resources in a stable environment increases level of alignment. In such environment, firms concentrate more on daily routine operations and producing more excess resources to create strategic options against unexpected changes. In this case, firms will have higher strategic risk and lower operating risk due to have more short-term slack.

On the other hand, during the financial crisis, firms will face an immediate shortages of funds. Such shortages require organizational changes through adaptability process. Firms employ excess resources that has been produced pre-crisis period to buffer and absorb sudden financial shocks from short-term fluctuations in the environment. Such situation will increase firms' strategic risk because firms need to invest more in future survival.

If firms achieve alignment successfully after financial crisis, this indicates presence of resource flexibility against risky activities. Firms that pursue highly adaptability-oriented strategies indicate presence of higher strategic risk-taking (Shimizu, 2007). If slack lowers significantly below aspiration level, and then firms increase their risk-taking activities in order to produce additional slack resources (Chiu and Liaw, 2009, Paeleman and Vanacker, 2015, Zona, 2012, Bromiley, 1991).

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<sup>116</sup> The following hypotheses are based on a contingency approach that predicts firm performance between risk-taking behaviours and adaptation processes, while the previous hypotheses assumed the influence of excess resources on firm performance (Soetanto and Jack, 2016b). The central argument is that organizational slack is essential for firm activities and it should meet the need of certain adaptation activities.



Otherwise, if managers perceive that they have sufficient slack resources for the target level and their firms as continuing operations daily routines in a satisfactory manner; they tend to reduce risk-taking activities and take only few risks. Threat rigidity theory and Prospect theory and (George, 2005) are often used to describe opposite side of risk-taking behaviours.

However, past studies on both theories has typically not clearly investigated the potential objectives to trigger risk-taking behaviours from the view of slack resources (Shimizu, 2007). It was argued by past studies that managers with greater level of slack would have higher firm performance, thereby engaging in risk-taking behaviours (Hsiu-Fen Tsai and Luan, 2016).

Managers differ in the risk-taking behaviours they wish to the most, and these differences determine the form of adaptation process they seek, such as alignment and adaptability (Chattopadhyay et al., 2001, Shimizu, 2007). The R&D, capital expenditure and long-term leverage, are the first determinants of strategic risk-taking index that needs to be verified. Therefore,

**Hypothesis 10a:** There is a positive link between strategic risk and performance in context of financial distress.

**Hypothesis 10b:** There is a positive link between operating risk and performance in context of financial distress.

**Hypothesis 10c:** The interaction effect of strategic slack and firm risk is associated positively with firm performance.

**Hypothesis 10d:** The interaction effect of operating slack and firm risk is associated positively with firm performance.

#### 3.3.6.1.                      Adaptation and Moderating Role of Strategic Risk

The extant literature has indicated a negative interaction between tactical risk-taking behaviours and firm performance. Put differently, consistent with TRT perspective, once managers achieve a certain level of performance, they do not want to risk losing that status by taking additional risky initiatives. They will want to maintain the current situation by means of alignment process. However, consistent with prospect theory, if managers perceive that performance is below the desired level before a financial crisis, they are most likely to want to take strategic risk during the financial crisis through adaptability process. Thus, hypothesis was proposed as:

**Hypothesis 11a:** Strategic risk moderates positively the relationship between adaptation processes (alignment and adaptability) and firm performance.

**Hypothesis 11b:** Strategic risk moderates the curvilinear relationship between adaptation processes (alignment and adaptability) and firm performance.

#### 3.3.6.2.                      Adaptation and Moderating Role of Operating Risk

According to the threat-rigidity theory, due to the lack of sufficient information regarding new environmental conditions, slack may increase operating risk for firms. The current ratio and interest coverage are the second determinants of strategic risk-taking index that needs to be verified. Agency theory suggests that high level of slack may weaken adaptive response of firms to the environmental changes due to misusing of those resources in not relevant investments (Soetanto and Jack, 2016b).

Further, too much slack may inhibit response strategy of firms by slowing the reaction to moves of competitors and sudden market shifts during the financial crisis rather than providing support to explore new opportunities (Pierce and Aguinis, 2013, Chiu and Liaw, 2009).

To test the indirect implication of risk-taking behaviours on slack management- performance relationship, operating risk strategy has been employed in a couple of statistical analyses. In realization of organizational objectives in the short-term, firms need to utilize resources that are highly crucial for daily routines.

According to prospect theory, alignment strategy needs a new way of thinking that may lead to small changes in firms' routines and short-run projects. In this case, sufficient strategic slack resources provide easing of controls to cope with environmental uncertainties (Chen et al., 2013, Chiu and Liaw, 2009, Guha, 2016). Thus, operating risk facilitates exploitation activities. Hence, the following hypotheses were proposed:

**Hypothesis 12a:** Operating risk moderates positively the relationship between adaptation processes (alignment and adaptability) and firm performance.

**Hypothesis 12b:** Operating risk moderates the curvilinear relationship between adaptation processes (alignment and adaptability) and firm performance.

#### 3.3.6.3.                      Adaptation and Interactions between Risk-Taking and Financial Crisis

Financial crises surprise firms and often radically change objectives of strategic actions. Some firms consider crisis as an opportunity to change. In contrast to the prospect theory, TRT argued that firms would act in a conservative manner under financial crisis (Greve, 2011, Latham and Braun, 2009a). Managers may pursue a risk-avoid firm strategy due to lack of sufficient information processes they can identify.

Threat may lead firms to maintain existing business conditions. Further, due to the resources constraint during the financial crisis, firms may behave more risk-aversely (Dolmans et al., 2014). As a result of this, they may be less likely to take risky initiatives and intend to invest less for future. Instead, firms tend to focus more on current routines.

Indeed, during the performing alignment-oriented activities, firms need to generate and employ operating slack (Greenley and Oktemgil, 1998, Venkatraman et al., 2007). Operating slack resources facilitates the execution of the current needs and daily operations by providing buffers for absorbing failure and reducing cost of innovation (George, 2005, Bourgeois, 1981). These arguments suggest the following hypotheses:

**Hypothesis 13a:** The interaction of financial crisis and strategic risk is positively linked with firm performance.

**Hypothesis 13b:** The interaction of financial crisis and operating risk is positively linked with firm performance.

### 3.3.7. Resource Ambidexterity

The consequences of time is accepted in the literature on adaptation and organizational slack. Ambidexterity refers to an ability to balance conflicting short-term and long-term firm objectives. Using both alignment and adaptability is needed for the current firm prosperity and future survival in terms of managers. The duality of alignment and adaptability is a notion that identifies main adaptation orientations in terms of “how the firms achieve profitability”. Venkatraman et al. (2007) distinguished simultaneous and sequential ambidexterity in order to reflect contemporaneous routines that balance alignment and adaptability.

According to them, simultaneous ambidexterity indicates ‘temporal sequence of routines’ in one specific time period (e.g., time  $t$  for both alignment and adaptability). On the other hand, sequential ambidexterity refers to joint effects of adaptability at (time  $t-1$ ) and alignment (time  $t$ ). By doing so, theoretical realization of the temporal condition of how organizations equilibrate the opposing constructs of alignment for current environment and adaptability for future environment under the financial crisis is described. Resource capability are considered as an important element for firms to be ambidextrous. However, past researches argued that ambidexterity has a significant relationship with firm performance

#### 3.3.7.1. Simultaneous Ambidexterity

Ambidexterity refers to simultaneous pursuit of alignment and adaptability. Alignment and adaptability are the unique strategies for firms to compete in an uncertain environment. Ambidexterity arises when a new opportunity is available for firm through exploiting its existing capabilities and assets. Simultaneous ambidexterity is the capability to perceive and seize spontaneous opportunities through simultaneous alignment and adaptability (Birkinshaw and Gibson, 2004, Josephson et al., 2015, Kauppila, 2010, Raisch et al., 2009).

Simultaneous ambidexterity is responsible for simultaneous slack management of alignment and adaptability strategies, hence helping to manage quick changes in the environment. In increasingly competitive environment, resource capability and slack management become key abilities for achieving superior firm performance. Furthermore, having difficult to imitate resources capabilities is important for firms, especially during the volatile environments. For these reasons, the capacity to combine alignment and adaptability becomes equally vital. Therefore, the study proposes that:

**Hypothesis 14a:** Simultaneous ambidexterity is positively associated with firm performance.

**Hypothesis 14b:** Simultaneous ambidexterity is negatively associated with firm performance.

### 3.3.7.2. Sequential Ambidexterity

Sequential ambidexterity refers to achieving resource ambidexterity by alternating between periods of alignment and adaptability (O'Reilly and Tushman, 2008). It is relevant to using alignment and adaptability in the same unit, but different times (Andriopoulos and Lewis, 2009). Sequential ambidexterity is suitable for stable environments, which provide a preparation time to respond any changes in environment (Josephson et al., 2015, Kauppila, 2010, Reeves et al., 2013, Wassmer et al., 2016).

Sequential ambidexterity emerges when firms adapt to a temporal sequencing between alignment and adaptation oriented strategies (Raisch et al., 2009). When environmental circumstances are changing, the firms are compelled to respond and being able to switch focal point between alignment and adaptability rapidly. Comparing to simultaneous ambidexterity, which is very difficult for firms to focus on alignment and adaptability at the same time, firms with sequential ambidexterity achieve more easily to desired level (Broersma et al., 2016). Given this rationale, the following was offered:

**Hypothesis 15a:** Sequential ambidexterity is positively associated with firm performance.

**Hypothesis 15b:** Sequential ambidexterity is negatively associated with firm performance.

## Summary

In this chapter, multiple concepts and approaches are used to describe the underlying tensions of adaptational slack and its allocation mechanism. The corresponding management perspectives of these opposing, but complementary tensions of strategic slack and operating slack are extensively explained. Excelling at both strategic and operating slack is crucial for successful adaptation, however focusing on both may result in conflict. A one-sided focus on alignment may for example lead to *failure traps*, while however adaptability oriented firms fall into *success traps*. To eliminate these traps the ambidexterity can be managed through both integration mechanism. Slack management through ambidexterity allows the firm to focus on both alignment and adaptability within the same industry.

On the contrary, slack management by level and form of slack differentiation refers to concentrating on either alignment or adaptability through splitting the practices throughout the firm. On the other hand, despite the beneficial insights this chapter offers, fragmentation of the existing perspectives within management literature is hence an initial point of critique. Chapter 3 addresses several criticisms by obtaining the most significant factors derived from different approaches on management literature. Several hypotheses were developed based on these criticism and arguments that were reviewed earlier. More specifically, the hypotheses were outlined as goals to investigate the effect of slack management through the adaptation process on financial performance within a single model.

# Chapter 4

## Introduction

The previous chapters discussed the general background and framework as well the hypotheses of the research in an attempt to address the research objectives and questions. This fourth chapter explains the research methodology and data analyses. Chapter 4 begins with general definitions regarding measurements, which include dependent, independent and controls variables. It elaborates on the type of research and methods employed for testing the dataset. Following this is an explanation of econometric specifications, econometric models and data analysis that includes sample selection and data correction, respectively.

### 4. Research Design and Methodology

#### 4.1. Research Philosophy

The most appropriate paradigm for research philosophy must be chosen by the researchers (Creswell and Poth, 2017). The one of the main issue of studies in social science is the philosophical assumption. This thesis employs a positivist approach where the theoretical developments are established based on slack-performance relationship that may be examined and empirically investigated using analytical techniques and theoretical assumptions.

Leavy (2017):91) stated that “*qualitative research was guided by the philosophy of positivism, which originally developed in the natural science. This tradition presupposes that reality exists independently of the research process and can be measured via the objective application of the science method.*”. Positivism can be described as “*...working with an observable social reality and that the end product of such research can be law-like generalisations similar to those produced by the physical and natural scientists*” (Remenyi et al., 1998):32).



In addition to this, Fellows and Liu (2009) pointed out that deductive approach is related to positivism. According to him, the causal association between variables needs to be described and conclusion needs to be generalized. Veal and Ticehurst (2005) propose that positivist researchers should use the deductive approach. Therefore, this thesis follows a deductive approach rather than inductive for the following reasons.

First, this thesis uses quantitative dataset and therefore it is empirical in nature. Second, thesis tries to identify causal relationship between slack and performance amongst variables rather than identifying research context. Third, this study relies mainly on statistical estimations rather than consideration of the opinions or personal experiences. Therefore, it uses mostly scientific principles and testing hypotheses rather than theory building (Saunders et al., 2009).

In summary, the research philosophy of this thesis is to seek to test existing hypotheses based on quantitative dataset but not to seek to build a new theory, hence the deductive approach is more suitable for this thesis.

## 4.2. Research Design

With a view to examining the empirical legitimacy of the varying and contrasting viewpoint on slack, this research employs different forms and forms of slack resources. The panel sample enables identifying the active evolution in each operation chronologically. Therefore, panel data can present more persuasive data for the relationship between slack and performance and achieve distinctions among divergent theories.

To analyse the data sample, several multivariate techniques were employed as well as various regression estimations- (including lag, dummy, linear and quadric interactions). The details of the sample data and the econometrics models and specifications are presented figure 4.3 below.

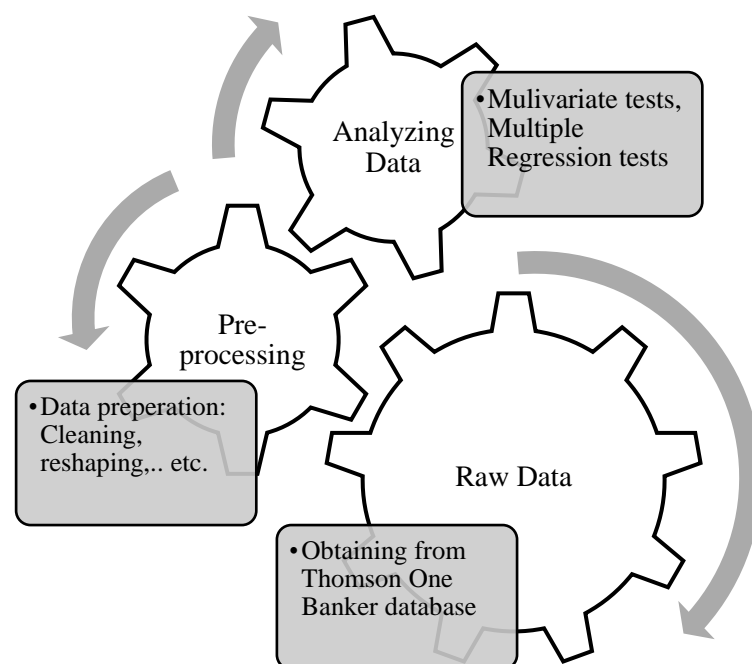


Figure 4-1 – Data analysis Process

#### 4.2.1. Sample selection, industry classification and unbalanced panel data

Empirical model was based on a sample of 671 public companies. Slack variables of the largest publicly traded European manufacturer companies were investigated with regard to different time periods of financial crisis. These European countries were selected due to their similar accounting system to increase reliability and comparability of the sample data. To evaluate conceptual model dataset was compiled by integrating information from several secondary sources, including Thomson One Banker, a database of financial information on Western European publicly-held manufacturer companies.

Company annual reports (10-K reports) were assessed and used for filling the gaps of missing data, where feasible. The data distribution characterizes an unbalanced panel given the existence of periods with missing data. The study also includes different sub-periods representing relative turbulence and environmental stability, spanning over the extended period, 2004-2013<sup>117</sup>. In particular, the periods (2007-2009) as the “financial crisis”; (2004-2006) as pre-crisis and (2010-2013) as the “post-crisis” as environmental stability period implies both before and after the financial crisis.

Overall, the above measures resulted in sample of 4490 firm-year observations. Due to lack of data for all firms during all time periods, data is unbalanced panel and number of firm observation is fewer comparing with a balanced panel data.

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<sup>117</sup> This affords great convenience to capture the influence of a monetary crisis on company performance and to evaluate the possible causal rapport between pertinent slack structure and company performance. However, for sub-periods the number of firms substantially larger than the number of observed time periods allows consideration of the result as asymptotically valid based on the assumption of a "short panel", namely, where the number of observation (NO) is “large” and time-period (TP) is “small” (Wooldridge, 2010).

Despite this issue, secondary measures facilitate to conduct a panel analysis, which is quite difficult to do same thing with primary data. In addition, secondary data provides objective and verifiable indicators of the financial resources.

Collected data was analysed with STATA 13.0<sup>®</sup> for the empirical tests of panel data. The study was limited to the manufacturer industries. In order to minimize differences between various industries that have different capital and organizational structure and would bias the estimation, the scope of study was narrowed to the manufacturer industries. Furthermore, there is no doubt that manufacturer industries have important roles in the European market<sup>118</sup>.

However, financial industries were excluded from the dataset since these firms are more regulated than the others (Mousa and Chowdhury, 2014). The sample is quite diverse with very large 11 European manufacturer industries<sup>119</sup>. All variables were collected for the last 10 years and financial measurements of the slack resources of those 10 years were calculated. Nace Rev 2. Industry classification “glossary”, which is including different SIC level<sup>120</sup> (two digit, three digit, and four digit numbers), was employed to reveal the impact of financial crisis on industries.

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<sup>118</sup> Especially, European economic area that includes some of the leading countries such as United Kingdom, France and Germany that are dominating the Euro zone. They are the engines of the economic growth in Europe. It explains over two thirds of EU exports and total private investment in R&D in Europe.

<sup>119</sup> It was essential to avoid as much as potential a selection bias toward corporations that were already active manufacturing industries (Bodnar et al., 1995). To resolve those problems, a technique was constructed for selecting a random sample of non-financial firms from Thomson One Banker database.

<sup>120</sup> See Appendix II for the 2-digit industry SIC-code.

The manufacturing industries show a conventional context to research the degree to which firm influence matter (Lubatkin et al., 2001). The financial data of manufacturer industries provide more opportunity to study organizational slack resources at a more meaningful level of detail than other industries. An advantage of manufacturer data is that it allows for distinguishing firms more easily at the business-level.

Selected industries are restricted to manufacturing industries due to three main reasons. First, manufacturer industries has become increasingly consolidated and they are characterized by high level of competition in European countries (Lubatkin et al., 2001). Second, classification of manufacturing industries provide better profile to identify similarity of industries and more accurately categorize industries into different industrial groups (Farjoun, 1998).

In addition, manufacturing industries provide constant conditions that may vary across industry sub-groups (Shaver and Flyer, 2000). Third, manufacturing industries provide more comprehensive dataset for researcher when comparing to other particular industries. For example, it is not been possible to collect specific data for financial industries such as inventory turnover or operation costs. Therefore, manufacturing industries allow for an internal consistency and provide more comprehensive dataset and better validity of the study.

#### 4.2.2. Data Corrections

Before testing descriptive statistics, the data was checked that whether given data is normally distributed. In some cases, data transformation enables to obtain better assumptions for specified model. Choosing the right transformation for the data, level of skewness and distribution were checked through histogram, scatter plot and qq-plot. One of the reasons for data-transformation is that it enables to make positively skewed distribution closer to normal. In addition, outliers are extreme observations and can create great difficulties (Kutner et al., 2005). In order to get rid of outliers; (1) data was initially checked and then drop (% 1 - %99) percentile to eliminate extreme values and reduce the effect of possibly outlier observations, and (2) a log-transformation has been applied to eight of ten variables because taking the natural log-transformation provides a better modelled relationship in between dependent and independent variables. This also helps to reduce potential outlier issues in the sample data. Table 4.1 provides the summary statistics<sup>121</sup> before/after data-transformations<sup>122</sup> of the variables used in the factor analysis and further analysis. Data was also deflated by the European producer price index (PPI).

Table 4-1- Summary Statistics for Slack Variables

	Raw					Transformed				
	mean	median	sd	skewness	kurtosis	mean	median	sd	skewness	kurtosis
R&D I	6.5362	1.8662	19.9984	8.4487	89.8141	1.2255	1.0530	1.0606	0.9439	3.9232
Working Cap.	0.2486	0.1853	0.3759	2.7383	20.6527	*	*	*	*	*
Div. I	2.0677	2.9280	1.7788	-0.1822	1.2234	0.8844	1.3681	0.7401	-0.3068	1.1703
Inventory I	0.3418	0.2497	0.4188	6.9573	77.2079	0.2677	0.2229	0.2032	3.0419	18.2059
SGA Exp. I	23.9647	19.8905	19.4129	2.5949	12.6204	2.9705	3.0393	0.7264	-0.3957	3.7864
MTBV I	2.0872	1.5748	2.1603	1.5261	13.0595	1.0174	0.9520	0.4906	0.7689	3.5654
Cash I	0.8594	0.0786	12.6456	30.9303	1050.5050	0.1801	0.0756	0.4287	6.9574	64.9008
Emp. I	222.7418	139.7894	360.1625	8.4054	102.3051	11.8854	11.8479	0.8954	-0.7790	11.3902
A.Turnover	0.9966	0.9465	0.4861	0.7467	4.1434	*	*	*	*	*
Leverage I	52.9750	38.5252	127.7923	-11.5116	278.3017	3.2803	3.7000	1.5879	-0.7997	2.7591

( I ) indicates a log- transformation in dataset. \* refers to N/A

<sup>121</sup> Table 4.1 shows the mean, median, standard deviations, skewness and Kurtosis

<sup>122</sup> Eight of the slack have been transformed to correct for skewness. An – ( I ) symbol indicates a transformation using the natural logarithm function. “log ()” command was used in STATA for this purpose.

### 4.3. Econometric Specifications

#### 4.3.1. Multivariate Analyses

##### 4.3.1.1. Factor Analysis, K-mean Clustering and Discriminant Function Analysis

To understand and validate the differences of adaptation behaviours or processes, three steps were adopted. In the first stage, the exploratory factor analysis (EFA) was employed in order to classify and validate such fundamental adaptation processes. According to (Chakravarthy, 1986, Chakravarthy, 1982, Chakravarthy, 1981), *'firms may adaptively fitted or misfitted with its environment and thus different state of adaptation must be considered'*.

To detect the fundamental adaptation processes, the principle component analysis (PCA) was initially employed. PCA decomposes given data into a range of linear components within data. PCA specifies how a variable makes contributions to specified component, which factor analysis creates estimated model from which factors are calculates. It can also be seen as a mathematical procedure that shows similarity to MANOVA and discriminant function analysis (DFA). As a beginning, a matrix addressing the relationships between slack variables are used. Secondly, by following this procedure, the linear components (factors) of the given matrix are estimated by specifying the eigenvalues of the matrix. Those eigenvalues are estimated by employing the specified eigenvalues<sup>123</sup>.

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<sup>123</sup> Eigenvalues verify the loading of a specific slack variable on a specific factor.

$$C_{jxj} = \left( \frac{I}{j} \right) Z^A Z$$

Where,  $Z_{fxj} = E_{fxj} C_{fxj} D_{fxj}^A$ ,  $E^A E = G_{fxj}$  and  $D^A D = G_{jxj}$  (G: identity matrix, E and D: Orthogonal).  $\lambda_1, \lambda_2 \dots, \lambda_n$  are the eigenvalues of covariance matrix and C,  $\lambda_1 \geq \lambda_2 \dots \geq \lambda_n \geq 0$  are the sorted sequences

The correlation of variance between the sample data and eigenvectors is extracted by dividing the eigenvalues to the total sum of the eigenvalues. Eigenvectors, which are reciprocally orthogonal to the exiting group of axes, decreases the sum of squared disturbance distance between points of sample data and its projections on the component axis. Various degrees of variance are ascribed to each eigenvector. The  $f$  eigenvector symbolizes the biggest  $f$  eigenvalues of C, which signify the highest degree of variance. The first sort order begins with the first principle component, which has the greatest degree of variance; and second sort order continues with the second principle components, which has the second greatest degree of variance, and so forth (Delen et al., 2013, Kantardzic, 2011).

As a second step, a *k-means cluster*, a non-hierarchical clustering technique, was performed on the factor scores to identify the adaptation profiles with a similar behaviour and/or profile pattern. Cluster is a procedure for agglomerating firms into groups so that the homogeneous firms in a cluster are similar to one another (Sarstedt and Mooi, 2014). This technique was chosen over the hierarchical clustering model because hierarchical clustering does not produce all possible combination on the basis of factor loadings of (“adaptability” and “alignment”) processes and for that reason it “appears to be more robust than any of the hierarchical methods” (Punj and Stewart, 1983): 139 (Slater and Olson, 2001) :1058)<sup>124</sup>.

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<sup>124</sup> The k-mean clustering procedure partitions a specified sample data into  $m$  mutually exclusive clusters such that the sum of the distances between the corresponding cluster centroid and sample data is minimized. The designated degree of distance between two data points is estimated as a measure of similarity. Multiple distance estimates can be employed depending on the dataset. Although Mahalanobis distance and Euclidean distance are the two notable examples for such a distance estimate. The standard Euclidean distance was adapted in this study for the distance estimate. Statistically, given several data or  $n$  no of points  $[x_1, x_2 \dots x_n]$  where  $n$  stands for number of observations, the k-means clustering procedure accumulates the data into  $m$  clusters. As the Euclidean distance was implemented as the distance estimate in this study, it is then clearly specified as:

$$dis. = \left( \sum_{i=1}^m \sum_{p \in S_i} (x_p - r_i)^2 \right)^{1/2}$$

Where  $S_i$  is the  $i$ -th cluster and  $r_i$ , is the centroid of the cluster  $S_i$  and  $x_p$  is an input form. Hence, k-mean clustering procedure is an iterative procedure that finds an appropriate partition. The common technique is to begin with the issue by randomly select  $m$  data points from the specified dataset. The residue data points are categorized to the  $m$  clusters by distance. The intended centroids were calculated in the  $m$  cluster and then updated.

The stages of the k-mean procedure are thus first defined in brief:

Stage 1: Select  $m$  primary cluster centers  $[r_1, r_2, \dots, r_m]$  randomly from the  $n$  points  $[x_1, x_2 \dots x_n]$

Stage 2: Allocate point  $x_p$ ,  $p=1, 2, \dots, n$  to cluster  $S_i$ ,  $i \in [1, 2, \dots, m]$

if  $\|x_p - r_i\| < \|x_p - r_z\|$   $z = 1, 2 \dots m, i \neq z$

Step 3: Calculate new cluster centres  $r^*1, r^*2, \dots, r^*m$

As following:

$$r_p^* = \frac{1}{n_p} \sum x_i \in S_p x_i \quad p=1, 2, \dots, m$$

Where  $n_p$  is the number of components pertains to cluster  $S_p$

Step 4: if  $r_p^* = r_p$ ,  $i=1, 2, \dots, m$  then terminates. Otherwise, start again from stage 2.



As a third step, DFA analysis was adopted. Prior analysis cited a number of pieces of research given over to the examination of a company's situation before resource constraints and financial distress. However, testing differences of multiple adaptation profiles is difficult in any univariate test lies therein. An appropriate development of the previously deployed multivariate methods, therefore, is to use the test results and synthesise many trials into a relevant analytical replica.

Following systematic examination of the type of problem and the aim of the study, DFA was chosen as the most apt statistical method to elucidate the possible equivocality in relation to the comparative performance of adaptation profiles. Even though DFA is not as popular as other multivariate tests such as factor analysis, cluster analysis and multivariate analysis, *DFA* has been also used in diverse disciplines as well as financial problems such as investment classification, adaptation and risk-taking behaviours.

DFA is employed to classify a refection into one of many a priori classes according to the aspect of each observation. It is principally used to classify and measure problems in which the resulting variable shows dichromatic construct, (e.g., adaptability-oriented and alignment-oriented profiles). Hence, the first stage is to determine unequivocal category categorizations.

The amount of analytical clusters may be a pair or more (Altman, 1968, Jackson and Wood, 2013). After specifying adaptation profiles (four adaptation profiles were identified earlier in cluster analysis) in k-mean clustering, DFA then seeks to obtain a linear combination of slack measures which may generate the optimum discriminate between adaptation profiles.

If a slack has characteristics that can be computed for all of firms in the procedure, the DFA decides a class of discriminant coefficients<sup>125</sup>.

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<sup>125</sup> The DFA test has the edge when examining a complete adjustment summary of qualities shared by the pertinent companies. However, Univariate tests may simply study the measurements used for class tasks one by one. The

On the other hand, maximum likelihood technique was adapted in the study to allocate a case to a group from quantified cut-off score. The first discriminant function maximizes the difference between the values of the adaptation profile (dependent variable). The second function amplifies the difference between the values of the adaptation profile while controlling the first function and so on. Therefore, first function is expected to reveal the most powerful differentiating slack variables. The second and later functions can show additional significant factors of differentiation.

The foremost benefit of the DFA in dealing with grouping problems is its capacity for testing the complete adaptation profile of the item simultaneously instead of scrutinising each particular feature in sequence. Given the descriptive information above, the DFA was chosen as most appropriate technique for the adaptation profiles based on earlier findings.

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purpose of DFA in this study is to maximally validate separation of adaptation groups by determining the most parsimonious way, reveal the slack variables that provide best discriminate between adaptation profiles as well as discard slack variables that are little related to group distinction. DFA is similar to regression analysis and equation as follows:

$$D_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where  $D_i$  refers to discriminant score or Z value;

$$\beta_1 + \beta_2 + \dots + \beta_n = \text{Discriminant coefficients}$$

$$x_1 + x_2 + \dots + x_n = \text{Discriminant coefficients}$$

While the DFA calculates the discriminant slopes,  $\beta_j$ , the explanatory slack measures  $x_j$  are the actual values.

Where,  $j = 1, 2, \dots, n$ .

A discriminant score can be measured based on the weighted combination of the continuous independent variables.

#### 4.3.1.2. Multiple Regression

Since this study employs panel data, the first consideration should be econometric issues. Mostly, three regression models are the common techniques that are used for panel data analyses: ‘Fixed and random effects model’ and ‘pooled model’. The ‘random effects model’ is suitable when a set of data reflects the features of a sample, not the entire population; this is because the single result is liable to be an arbitrary result in an unsystematic sample.

The panel data can be treated by using random effects model in the research as an indiscriminate sample from a major population because the panel data is taken from a number of countries and industries. Also, factors may be remarkable in the dataset. Therefore, fixed effect model was also performed, which is supported by the findings of other tests – an F-statistic test, a Lagrange multiplier (LM) test, a Hausman-specific test, a modified Wald test, and Breach-Pagan test conducted, but not presented in the study.

However, this research also considered the classical assumptions of regression such as serial correlation and heteroscedasticity issues. Generally, these assumptions are limiting the flexibility of panel data. A number of contexts exist where became apparent to serial correlation and heteroscedasticity. For instance, the strategic choices in relation to resource allocation, risk-taking or alternative investment decisions can vary significantly for firms and this can lead to heteroscedasticity, and an undocumented jolt at a particular time may modify these aspects for a minimum of two years and lead to serial correlation.

Therefore, these assumptions were checked initially, and then several statistical tests were performed to reveal if heteroscedasticity and serial correlation exist in the panel data (Hoffmann, 2014, Pesaran, 2015, Wooldridge, 2010).

For example, to scrutinize the homoscedasticity of the model, Breusch-Pagan test<sup>126</sup> was applied and test results reject the null hypothesis of homoscedasticity and accept the issue of group-wise heteroscedasticity. Additionally, modified Wald-test was performed to detect panel-level group-wise heteroscedasticity in the model.

The results confirmed that all time periods for manufacturer industries have group-wise heteroscedasticity. Although both random and fixed effects models can deal with the heteroscedasticity issue across panels, neither overcomes a possible issue of autocorrelation within the panels. To test the presence of autocorrelation in the panel data, Woolridge's test<sup>127</sup> for serial correlation was used. An autoregressive process of order one AR (1) model is a representation of a type of random estimation process<sup>128</sup>. FGLS estimator<sup>129</sup> is more efficient and appropriate estimator in the case of large N and small T (short panel) than random effects model and fixed effects model. FGLS model is also more preferable because it accounts better for heteroscedasticity and autocorrelation issues.

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<sup>126</sup> To test *Breusch-Pagan-test*, after OLS regression, “*hettest*” command was used in STATA.

<sup>127</sup> To apply *xtserial*, simply specify the predictor and predicted variables: “*xtserial depvar indepvars*” in STATA

<sup>128</sup> To test whether the errors follow an autoregressive process, a dynamic regression model was employed. Estimator equation is as follows;

$$\varepsilon_{it} = \rho \varepsilon_{it} + \varphi_{it}, t=2, \dots, T_n$$

Where  $|\rho| < 1$  and  $\varphi_{it} \sim \text{IID}(0, \sigma_\varphi^2)$

$|\rho|$  denotes the null hypothesis. After estimation of  $(\varepsilon)$  on  $it-1$  ( $\varepsilon$ ) for all  $t = 2, \dots, T_n$ , the null hypothesis was rejected in accordance with t statistics for  $\hat{\rho}$  and autocorrelation AR (1) within panels was accepted.

In addition, the eleven-year time-period panel, which includes different year periods (2-years, 3-years and 4-years periods), provides great convenience to control for unobserved heterogeneity. The impact of predictor variables may not affect outcome variables, immediately. In the light of these findings and factors, to deal with the autocorrelation problem and to reduce any possible causality links from slack variables to performance variable for all predictor variables, lagged dependent variables were included in the model. After performing several tests, the results evidenced the presence of heteroscedasticity and serial correlation, which are not introduced in the study.

<sup>129</sup> Another powerful estimation method for both autocorrelation and the heteroscedasticity is the Generalized Method of Moment (GMM) model. This model is also effective to deal with the endogeneity problems. Unfortunately, due to insufficient year observation for each period (each time-period has less than 5 years), it is not possible to use GMM model. Instead, to deal with these problems, feasible generalize least square (FGLS) model was preferred.

FGLS estimator is more powerful comparing with other models mentioned above. Therefore, by following previous studies<sup>130</sup>, in order to control the serial correlation and heteroscedasticity issues, the feasible generalized least squares, (FGLS) model, suggested by Wooldridge (2002), is used in the research.

An empirical model that is used by some prior studies is given by

$$Firm\ Performance = f(X, \eta, \zeta, \omega)$$

Where X is a vector of characteristic of slack resources that may affect the firm performance; ( $\eta$ ) is the unobserved firm effect; ( $\zeta$ ) is the unobserved time effect; and ( $\omega$ ) is the unobserved country effect. Since the impact of the environment effect must be considered, a moderator variable (EE) environmental effect (the vectors of level of environmental dynamism, munificence and velocity) is included in the model;

$$Firm\ Performance = f(EE, X, \eta, \zeta, \omega)$$

Where performance is the ratio of Tobin's Q; firm ( $i$ ) in time period ( $t$ ); EE is the vector of measures to capture environmental dynamism, complexity and munificence in industry ( $j$ ) in time period ( $t$ ); X is the set of slack characteristics that may affect firm performance in industry ( $j$ ) in time period ( $t$ ); ( $\eta$ ) is time-invariant firm effects in industry ( $j$ ); ( $\zeta$ ) is industry-invariant time effects in time period ( $t$ ); ( $\omega$ ) is country – invariant country effects in time period; and ( $\varepsilon$ ) is the idiosyncratic error term.

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<sup>130</sup> Some relevant references are (George, 2005, Canina et al., 2005, Bradley et al., 2011b, Yang et al., 2014a, Philippe and Durand, 2011, Wang et al., 2016a, Roy and Sarkar, 2015, Mudambi and Swift, 2014, Zhu and Chen, 2015)

#### 4.4. Econometric Models

To scrutinize the interaction between organizational slacks and the firm performance as well as risk-taking capabilities and environmental determinants described earlier, a (FGLS) feasible generalizes least square model was employed in the following form:

(a)<sup>131</sup>

$$y_{itjk} = \alpha + \beta X_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

Where  $i$  specifies an individual firm;  $t$  denotes year;  $j$  specifies individual industry;  $k$  specifies individual country;  $y_{itjk}$  refers to performance variable (*Tobin's Q*).  $X_{i(t-1)jk}$  represents the set of strategic slack and operating slack variables with a lag year  $t$ ;  $\eta$ ,  $\zeta$ , and  $\omega$  refer to year, industry and country dummies, respectively;  $\varepsilon_{it}$  is a normally distributed variable error term. Another significant concern with regression estimation is a '*lag-configuration*'.

A lag model is estimated in the study because of the fact that, as Daniel et al., (2004) pointed out, whether or not including lagged slack variables affect empirical findings of slack-performance relationships. This finding is also consonance with a theoretical consideration. As theories argued earlier, organizational slack influences a company's capacity for dealing with judgements related to tactical options, taking initiatives for risky investments, uncertainties, and managerial incentives. Those capabilities, initiatives, incentives and decisions, in turn, affect firm performance. Those factors also demand (a certain period of) time to realize.

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<sup>131</sup>  $\eta$ ,  $\zeta$ , and  $\omega$  are the year effect, industry effect and country effect dummies, respectively. [Year= Y1...Yn; Industry= J1,...,Jn; Country= C1,...,Cn].

$$\left. \begin{array}{l} \eta = 1 \text{ if } t = \text{year } 1 \\ \eta = 0 \text{ otherwise} \end{array} \right\} \quad \left. \begin{array}{l} \zeta = 1 \text{ if } j = \text{industry } 1 \\ \zeta = 0 \text{ otherwise} \end{array} \right\} \quad \left. \begin{array}{l} \omega = 1 \text{ if } k = \text{country } 1 \\ \omega = 0 \text{ otherwise} \end{array} \right\}$$

In addition, same logic has been used in subsequent models.

Accordingly, it must be clarified that whether a time delay between slack and performance is a factor that influence such a relationship over-time. Simultaneous and sequential slack - performance relationship will be analyzed in further sections. Specifically, since different form of slack resources cannot be used directly like potential slack, the lag-year influence of slack-performance relationship would be relayed. It is transparently obvious that they were changed by the historically-documented financial crisis in the earlier 2007 and late 2008. Thus, the effects of observing a (dramatic, sharp or other) financial crisis in industry  $j$  at time  $t$  is an indicator of controls at the times  $t$  and the *environmental jolt* function at time  $t$ :

$$y_{itjk} = f(\psi_{itjk} \text{Financial Crisis}_t)$$

Where  $j$  refers to an individual industry or country;  $t$  refers to year;  $\psi_{it}$  refers to control variables. *Financial Crisis<sub>jt</sub>* or *Financial Crisis<sub>jt</sub>* refer to financial crisis dummy variable (0 is crisis, 1 is otherwise).

## Equations

To understand main effect of financial crisis, a financial crisis dummy has been created and added to second model. The initial model consists of ten slack ratios, which were also tested by Chakravarthy (1986) and Greenley and Oktemgil (1998). Unlike them, the model was also examined before, during and after the financial crisis. The financial crisis dummy variable was only added to the general model. The first and second formulas show the same pattern, only with a difference; in the second model, financial crisis was added to general model. Therefore, first equation will be used as baseline model.

Extending function (1) to represent the variables, the main model is formulated as follows:

$$\begin{aligned}
 (1) \ y_{itjk} &= \alpha + \beta_1 R\&D_{i(t-1)jk} + \beta_2 Working\ Capital_{i(t-1)jk} + \beta_3 Dividend_{i(t-1)jk} + \\
 &\beta_4 Inventory_{i(t-1)jk} + \beta_5 SG\&A_{i(t-1)jk} + \beta_6 MTBV_{i(t-1)jk} + \beta_7 Cash_{i(t-1)jk} + \\
 &\beta_8 Employee_{i(t-1)jk} + \beta_9 Asset\ Utilization_{i(t-1)jk} + \beta_{10} Leverage_{i(t-1)jk} + \beta_{11} Controls_{i(t-1)jk} + \\
 &\sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon \\
 (2) \ ^{132}y_{itjk} &= \alpha + Financial\ Crisis_t + \beta_1 R\&D_{i(t-1)jk} + \beta_2 Working\ Capital_{i(t-1)jk} + \\
 &\beta_3 Dividend_{i(t-1)jk} + \beta_4 Inventory_{i(t-1)jk} + \beta_5 SG\&A_{i(t-1)jk} + \beta_6 MTBV_{i(t-1)jk} + \beta_7 Cash_{i(t-1)jk} + \\
 &\beta_8 Employee_{i(t-1)jk} + \beta_9 Asset\ Utilization_{i(t-1)jk} + \beta_{10} Leverage_{i(t-1)jk} + \beta_{11} Controls_{i(t-1)jk} + \\
 &\sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon
 \end{aligned}$$

<sup>132</sup> Where  $\sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k$  stand for unobserved year, industry and country effects, respectively and  $y_{itjk}$  is the change in the firm performance (Tobin's Q); Financial Crisis<sub>t</sub> refers to financial crisis dummy variable;  $\alpha$  stands for the lagged year among the selected variables<sup>132</sup>;  $\beta$  specifies specific constant for each variable;  $i$  refers to an individual industry or country;  $t$  refers to year;  $R\&D_{i(t-1)jk}$  refers to lag-year R&D slack ratio;  $Working\ Capital_{i(t-1)jk}$  refers to lag-year working capital turnover ratio (working capital to total sales);  $Dividend_{i(t-1)jk}$  refers to lag-year dividend pay-out ratio;  $Inventory_{i(t-1)jk}$  refers to lag-year inventory turnover ratio (total inventory to total sales);  $SG\&A_{i(t-1)jk}$  refers to lag-year marketing expenses ratio (selling and general administration (SG&A) expenses to total sales);  $MTBV_{i(t-1)jk}$  refers to lag-year market to book value (MTBV) ratio;  $Cash_{i(t-1)jk}$  refers to lag-year cash to sales ratio;  $Employee_{i(t-1)jk}$  refers to lag-year sales per employee ratio (sales to number of employee);  $Asset\ Utilization_{i(t-1)jk}$  refers to lag-year asset turnover ratio (total asset to total sales);  $Leverage_{i(t-1)jk}$  refers to lag-year leverage ratio (total debt to equity);  $Controls_{i(t-1)jk}$  refer to control variables (firm size and firm age);  $\varepsilon$  refers to error term.



On the other hand, the dependent variable reflects firm performance heterogeneity that are driven by accountant-based Tobin's Q ratio. It captures factors behind slack management decisions that reflects the firm resource-based adaptation behaviours, i.e., changes in the primary balance of adaptation processes by using appropriate form and form of slack resources. However, for further analyses, not all movements in the Tobin's Q ratio reflected different interventions regarding resource accumulation strategies. Thus, for robustness purposes alternative dependent variables that capture the change in investment and risk behaviours in the context of an environmental jolt was employed.

Another accounting-based variable is the variation in the Altman's z-score. The designation mirrors alterations in investment philosophy motivated by both adaptability and alignment strategies and captures solely financial distress that shows level of financial strengths and risks.

As well as linear regressions, a quadratic regression estimation is also used to decide the significance of curvilinear links: the effects of adaptation slacks, risk-taking capabilities and environmental conditions on firm performance can be negative at higher level of slacks but positive at lower levels of slacks, or vice versa. In theory, there could be either linear (positive and negative) or curvilinear (U-shaped and inverse U-shaped) influences of slack on performance, and outcomes might not be lucid.

Regarding the curvilinear relationship, several past studies already recommended a non-linear (curvilinear) slack-innovation and risk-performance relationship. For instance, Bromiley (1991:44) pointed out that "firms with much slack obtain a competitive advantage and firms with little slack must manage carefully". This means the level of slack influences firm performance to a certain degree (e.g., high and low levels), and in-between (intermediate) level of slack impacts firm performance negatively.

Nohria and Gulati (1996) and Lin et al. (2009b) suggested a U-shaped relationship that happens due to effect of too little and too much slack resources. For example, insufficient slack discourages exploration activities whose result is uncertain, and excessive slack, however, breeds complacency and leads to disturbance in organization and lack of discipline.

In sum, several slack studies point out a quadric slack-performance relationship, but those studies did not reach a compromise conclusion as to whether the link is a reversed U-shaped. Therefore, quadric regression equations were also considered in order to examine and proof existence of a curved rapport between slack and performance as follows:

$$(1) y_{itjk} = \alpha + \beta_1 R\&D_{i(t-1)jk} + \beta_2 Working\ Capital_{i(t-1)jk} + \beta_3 Dividend_{i(t-1)jk} + \beta_4 Inventory_{i(t-1)jk} + \beta_5 SG\&A_{i(t-1)jk} + \beta_6 MTBV_{i(t-1)jk} + \beta_7 Cash_{i(t-1)jk} + \beta_8 Employee_{i(t-1)jk} + \beta_9 Asset\ Utilization_{i(t-1)jk} + \beta_{10} Leverage_{i(t-1)jk} + \beta_{11} Controls_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

The function (1) represents baseline equation that includes only strategic slack, operating slack, control variables and industry and country effect dummy variables.

$$(2) y_{itjk} = \alpha + Financial\ Crisis_t + \beta_1 R\&D_{i(t-1)jk} + \beta_2 Working\ Capital_{i(t-1)jk} + \beta_3 Dividend_{i(t-1)jk} + \beta_4 Inventory_{i(t-1)jk} + \beta_5 SG\&A_{i(t-1)jk} + \beta_6 MTBV_{i(t-1)jk} + \beta_7 Cash_{i(t-1)jk} + \beta_8 Employee_{i(t-1)jk} + \beta_9 Asset\ Utilization_{i(t-1)jk} + \beta_{10} Leverage_{i(t-1)jk} + \beta_{11} Controls_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

The function (2) represents nonlinear regression equation estimated by adding squares of strategic and operating slack variables into baseline equation. The result of slack on a company's performance is dependent on an environmental jolt. To understand the effect of financial crisis to slack-performance relationship, financial crisis as well as interaction dummies with strategic and operating slack variables were integrated (see function (3)). The interaction between excess resources and performance is moderated by environmental jolt.

If slack encourages risk -taking initiatives and leading to better performance, the downside effect of financial crisis is smaller even negligible or vice-versa. To determine whether the degree of effect of financial crisis on slack -performance relationship, a dummy technique was employed. The dummy interaction regression equation was used in function (3) as follows:

$$(3) \quad y_{itjk} = \alpha + \beta_1 \text{Strategic Slack}_{i(t-1)jk} + \beta_2 \text{Operating Slack}_{i(t-1)jk} + \beta_3 \text{Financial Crisis}_t + \beta_4 \text{Strategic Slack}_{i(t-1)jk}^2 + \beta_5 \text{Operating Slack}_{i(t-1)jk}^2 + \beta_6 \text{Strategic Slack}_{i(t-1)jk} * \text{Financial Crisis}_t + \beta_7 \text{Operating Slack}_{i(t-1)jk} * \text{Financial Crisis}_t + \beta_8 \text{Controls}_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

Where financial crisis is the dummy variable that is described as “0” is crisis and “1” is otherwise.

On the other hand, the equations have been presented thus far provide evidence that slack – performance and effect of financial crisis on this relationship at which may diversify relative to their focused adaptation strategies. However, firm environments characterise one of the major contingencies encountered by a firm.

Therefore, this study also investigates the performance-environment relationship. It examines the amount that ‘*munificence and dynamism*’ moderate the performance-slack relationship. These two environmental characteristics (munificence and dynamism) can develop features of an industry in a fairly economical grouping. The estimation equation(s) of moderating influence of *environmental conditions (e.g., dynamism and munificence) on interaction between the slack and performance* as follows:

$$\begin{aligned}
(4) \quad y_{itjk}^{133} = & \alpha + \beta_1 \text{Strategic Slack}_{i(t-1)jk} + \beta_2 \text{Operating Slack}_{i(t-1)jk} + \beta_3 \text{Financial Crisis}_t + \\
& \beta_4 \text{Strategic Slack}_{i(t-1)jk}^2 + \beta_5 \text{Operating Slack}_{i(t-1)jk}^2 + \beta_6 \text{Strategic Slack}_{i(t-1)jk} * \text{Financial Crisis}_t + \\
& \beta_7 \text{Operating Slack}_{i(t-1)jk} * \text{Financial Crisis}_t + \beta_9 \text{Dynamism} * \\
& \text{Strategic Slack}_{i(t-1)jk} + \beta_{10} \text{Dynamism} * \text{Operating Slack}_{i(t-1)jk} + \\
& \beta_{11} \text{Dynamism} * \text{Strategic Slack}_{i(t-1)jk}^2 + \beta_{12} \text{Dynamism} * \text{Operating Slack}_{i(t-1)jk}^2 + \text{Munificence} * \\
& \text{Strategic Slack}_{i(t-1)jk} + \beta_{10} \text{Munificence} * \text{Operating Slack}_{i(t-1)jk} + \\
& \beta_{11} \text{Munificence} * \text{Strategic Slack}_{i(t-1)jk}^2 + \beta_{12} \text{Munificence} * \text{Operating Slack}_{i(t-1)jk}^2 + \\
& \text{Dynamism} * \text{Munificence}_{i(t-1)jk} + \text{Dynamism} * \text{Munificence} * \text{Operating Slack}_{i(t-1)jk} \\
& \beta_{12} \text{Dynamism} * \text{Munificence} * \text{Operating Slack}_{i(t-1)jk}^2 \beta_{13} \text{Controls}_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \\
& \sum_k^r \beta_k \omega_k + \varepsilon
\end{aligned}$$

<sup>133</sup> Where  $y_{it}$  denotes the Tobin's Q of firm  $i$ 's at time  $t$ ;  $\text{Strategic Slack}_{i(t-1)jk}$  indicates R&D to sales ratios of firm  $i$ 's at time  $t-1$ ;  $\text{Operating Slack}_{i(t-1)jk}$  stands for MTBV ratio of firm  $i$ 's at time  $t-1$ ;  $\text{Financial Crisis}_t$  denotes financial crisis dummy of firm  $i$ 's at time  $t$ ;  $\text{Strategic Slack}_{i(t-1)jk}^2$  represents square of R&D to sales ratios of firm  $i$ 's at time  $t-1$ ;  $\text{Operating Slack}_{i(t-1)jk}^2$  refers to square of MTBV ratio of firm  $i$ 's at time  $t-1$ ;  $\text{Strategic Slack} * \text{Financial Crisis}_t$  refers to interaction variable of R&D slack and crisis dummy of firm  $i$ 's at time  $t-1$ ;  $\text{Operating Slack} * \text{Financial Crisis}_t$  refers to interaction measurement of MTBV ratio and crisis dummy of company  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Strategic Slack}_{i(t-1)jk}$  denotes interaction variable of environmental dynamism and R&D slack of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Operating Slack}_{i(t-1)jk}$  refers to interaction variable of environmental dynamism and MTBV of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Strategic Slack}_{i(t-1)jk}^2$  refers to interaction variable of environmental dynamism and square of R&D intensity of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Operating Slack}_{i(t-1)jk}^2$  refers to interaction variable of environmental dynamism and square of MTBV of firm  $i$ 's at time  $t-1$ ;  $\text{Munificence} * \text{Strategic Slack}_{i(t-1)jk}$  stands for interaction variable of environmental munificence and R&D slack of firm  $i$ 's at time  $t-1$ ;  $\text{Munificence} * \text{Operating Slack}_{i(t-1)jk}$  refers to interaction variable of environmental munificence and MTBV of firm  $i$ 's at time  $t-1$ ;  $\text{Munificence} * \text{Strategic Slack}_{i(t-1)jk}^2$  refers to interaction variable of environmental munificence and square of R&D slack of firm  $i$ 's at time  $t-1$ ;  $\text{Munificence} * \text{Operating Slack}_{i(t-1)jk}^2$  refers to interaction variable of environmental munificence and square of MTBV of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Munificence}$  denotes interaction variable of environmental dynamism and munificence of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Munificence} * \text{Operating Slack}_{i(t-1)jk}$  refers to three-way interaction variable between environmental dynamism, munificence and MTBV ratio of firm  $i$ 's at time  $t-1$ ;  $\text{Dynamism} * \text{Munificence} * \text{Operating Slack}_{i(t-1)jk}^2$  refers to three-way interaction variable between environmental dynamism, munificence and square of MTBV ratio of firm  $i$ 's at time  $t-1$ ;  $\text{Controls}$  denotes control variable (firm age and firm size) of firm  $i$ 's at time  $t-1$ ;  $\zeta$  and  $\omega$  refers to industry effect and country effect, respectively;  $\varepsilon_{it}$  refers to error term.

However, z-score was used as an alternative performance ratio. In order to clarify whether any significant relationship between Tobin's q ratio as main performance variable and financial crisis with z-score, the following function (5) was employed:

(5)

$$y_{itjk} = \alpha + \beta_1 \text{Performance}_{itjk} + \beta_2 \text{Performance for post-Crisis}_{itjk} + \beta_3 \text{Financial Crisis}_t + \beta_4 \text{Post-crisis Dummy} * \text{Performance}_{itjk} + \beta_5 \text{Controls}_{itjk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

Where  $Z_{it}$  represents Altman's z-score; *Performance* refers to Tobin's q ratio, *perform.* for post-crisis refers to post-crisis Tobin's q value; post-crisis dum.\*performance refers to interaction variable between post-crisis dummy and Tobin's q value; Controls refer to firm size (total asset) and firm age, respectively. This equation is important because it represents relationship between z-score, financial crisis and relative interaction effect between post-crisis dummy and Tobin's q ratio. Z-score is a proxy for financial distress. As Ferrier et al. (2002) pointed out, the poor performance is related to z-score.

Consistent with past views (Kahneman and Tversky, 1979, Chakravarthy, 1986, Chakravarthy, 1982), if adaptation activity is changed by two diverse measurements of after crisis performance that capture factors of slack management as well as risk-taking capabilities. Therefore, to test the robustness of findings using z-score as a proxy of financial distress, performance and post-crisis performance was used. If the results are significant and positive, then it may be understood there exists a robust link between performance variable and Z-score in a crisis situation (see regression Table 5.25).

However, it was tested that how pre-crisis performance and risk taking capabilities affect post-crisis performance. The assessment of short-term and long-term risk is very critical to predict pre-crisis performance effect on post-crisis performance. To do so, the following regression was estimated:

(6)<sup>134</sup>

$$\text{Perf. Pos-crisis}_{itjk} = \alpha + \beta_1 \text{Perf. Post-crisis}_{itjk} + \beta_2 \text{Strategic Risk}_{itjk} + \beta_3 \text{Operating Risk}_{itjk} + \beta_4 \text{Controls}_{itjk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

Considering the importance of risk-taking capabilities in a time of crisis, it is important to understand how firms manage their risk. The variations in risk-taking is assumed to be affected by the firm position in the industry (Mishi et al., 2016). However, less competition among firms could result in lower strategic and operating risk, which might raise the firms' alignment as a result of moral hazard issues.

The highly concentrated manufacturer industries present an opportunity to investigate financially such issues Prior experience variable also included to model. Buckley et al. (2016) suggested that prior experience encourages risk-taking behaviours to increase resource commitment. Given the risk-taking capabilities, the significant resource commitments and available resource flexibility, the following model was estimated to elucidate the impact of risk and excess resources management on firm performance (See Table 5.26).

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<sup>134</sup> where  $Pre_{post-crisis}$  is the post-crisis performance measure for firm  $i$  at the  $t$  pre-crisis period;  $Performance_{itpre}$  is a vector of the related regression coefficient for pre-crisis period; Strategic risk refers to strategic risk index that includes composite form of *R&D*, *Capex*, and *Long-Term Debt*; Operating risk refers to composite form of *current ratio* and *interest coverage*; Controls stands for controls variables (firm size and firm age) for firm  $i$  at the  $t$  pre-crisis period;  $\eta$ ,  $\zeta$ ,  $\omega$  refer to year dummy, industry dummy and country dummy for firm  $i$  at the  $t$  pre-crisis period, respectively (see Table 5.23).

Therefore, estimation is as follows:

$$\begin{aligned}
 (7) \\
 y_{itjk} = & \alpha + \beta_1 \text{Industry Concentration}_{i(t-1)jk} + \beta_2 \text{Prior Experience}_{i(t-1)jk} + \beta_3 \text{Strategic Risk}_{i(t-1)jk} + \\
 & \beta_4 \text{Operating Risk}_{i(t-1)jk} + \beta_5 \text{Strategic Slack}_{i(t-1)jk} + \beta_6 \text{Operating Slack}_{i(t-1)jk} + \\
 & \beta_7 \text{Strategic Slack}_{i(t-1)jk}^2 + \beta_8 \text{Operating Slack}_{i(t-1)jk}^2 + \beta_9 \text{Strategic Risk}_{i(t-1)jk}^2 + \\
 & \beta_{10} \text{Operating Risk}_{i(t-1)jk}^2 + \beta_{11} \text{Strategic Slack} * \text{Strategic Risk}_{i(t-1)jk} + \\
 & \beta_{12} \text{Strategic Slack} * \text{Operating Risk}_{i(t-1)jk} + \beta_{13} \text{Operating Slack} * \text{Strategic Risk}_{i(t-1)jk} + \\
 & \beta_{14} \text{Operating Slack} * \text{Strategic Risk}_{i(t-1)jk}^2 + \beta_{15} \text{Operating Risk} * \text{Operating Slack}_{i(t-1)jk}^2 + \\
 & \beta_{16} \text{Strategic Slack} * \text{Operating Risk}_{i(t-1)jk} + \\
 & \beta_{17} \text{Strategic Risk} * \text{Strategic Slack} * \text{Operating Slack}_{i(t-1)jk} + \\
 & \beta_{18} \text{Operating Risk} * \text{Strategic Slack} * \text{Operating Slack}_{i(t-1)jk} + \beta_{19} \text{Controls}_{i(t-1)jk} + \sum_t^n \beta_t \eta_t + \\
 & \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon
 \end{aligned}$$

Where industry concentration refers to ‘*Herfindahl-Hirschman Index – HHI*’; Prior experience refers to firm sales growth. Other variables will not be mentioned here because of mentioned previously. However, it is possible that firms with lower performance cannot afford to become more proactive in terms of risk-taking to achieve better performance outcome. Threat rigidity theory suggests that low performance tends to reduce risky activities. On the other hand, prospect theory argues that low level of performance encourages firms to become more aggressive to attain the level of performance aspiration.

As a result of these factors, firms’ resource capabilities (resource flexibility and resource commitment) and adaptation capacity (alignment and adaptability) may change depends on allocation of slack resources, (which may also depends on these factors). Therefore, a new model should be include these three factors together. Industry concentration and prior experience have also some implications on risk-taking capabilities, resource allocation and adaptation capacity.

Therefore, these two variables also included. Further, to understand mediating effects of risk-taking capabilities and reveal whether any curvilinear relationship is exist, interaction variables and quadric forms of variables were also added to model (see table 5.28). Thus, next function (8) is as follows:

(8)

$$\begin{aligned}
y_{itjk} = & \alpha + \beta_1 \text{Industry Concentration}_{itjk} + \beta_2 \text{Prior Experience}_{itjk} + \beta_3 \text{Strategic Risk}_{itjk} + \\
& \beta_4 \text{Operating Risk}_{itjk} + \beta_5 \text{Alignment}_{itjk} + \beta_6 \text{Adaptability}_{itjk} + \\
& \beta_7 \text{Strategic Risk} * \text{Operating Risk}_{itjk} + \beta_8 \text{Strategic Risk}_{i(t-1)jk}^2 + \beta_9 \text{Operating Risk}_{i(t-1)jk}^2 + \\
& \beta_{10} \text{Adaptability}_{i(t-1)jk}^2 + \\
& \beta_{11} \text{Adaptability} * \text{Strategic Risk}_{itjk} + \beta_{12} \text{Adaptability} * \text{Strategic Risk}_{i(t-1)jk}^2 + \\
& \beta_{13} \text{Adaptability} * \text{Operating Risk}_{itjk} + \\
& \beta_{14} \text{Adaptability} * \text{Operating Risk}_{i(t-1)jk}^2 + \beta_{15} \text{Adaptability} * \text{Operating Risk} * \text{Strategic Risk}_{itjk} + \\
& \beta_{16} \text{Alignment}_{i(t-1)jk}^2 + \beta_{17} \text{Alignment} * \text{Strategic Risk}_{itjk} + \beta_{18} \text{Alignment} * \text{Strategic Risk}_{i(t-1)jk}^2 + \\
& \beta_{19} \text{Alignment} * \text{Operating Risk}_{itjk} + \\
& \beta_{20} \text{Alignment} * \text{Operating Risk}_{i(t-1)jk}^2 + \beta_{21} \text{Alignment} * \text{Operating Risk} * \text{Strategic Risk}_{itjk} + \beta_4 \text{Controls}_{itjk} + \\
& \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon
\end{aligned}$$

Where adaptability refers to factor scores of strategic slack ratios; alignment refers to factor scores of operating slack ratios. As discussed previous chapters, financial crisis may have major implications on slack-performance relationship. In addition to previous model, financial crisis dummy and two interaction variables added to the equation.

The model involves adaptation capacity variables as well as risk-taking capability variables. The main focus is on analysing reasons for performance weaknesses directly or indirectly related to financial crisis. To that end, slack management was decompose into sub-components that are more or less likely to be associated with financial crisis (see table 5.29).



Therefore, regression equation was used in function (9) as follows:

(9)

$$y_{itjk} = \alpha + \beta_1 \text{industry Concentration}_{itjk} + \beta_2 \text{Prior Experience}_{itjk} + \beta_3 \text{Strategic Risk}_{itjk} + \beta_4 \text{Operating Risk}_{itjk} + \beta_5 \text{Adaptability}_{itjk} + \beta_6 \text{Alignment}_{itjk} + \beta_7 \text{Financial Crisis}_{itjk} + \beta_8 \text{Strategic Risk} * \text{Financial Crisis}_{itjk} + \beta_9 \text{Operating Risk} * \text{Financial Crisis}_{itjk} + \beta_{10} \text{Controls}_{itjk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

The final equation is related to firm ambidexterity. As mentioned before, the choice of simultaneous and sequential ambidexterity can be attributed to three factors; (1) industry concentrations, (2) strategic risk, and (3) environmental dynamism. Therefore, these three factors were added to model as well as their interaction variables with both simultaneous and sequential ambidexterity. Financial crisis also added to model as external effect (See table 5.31).

(10)

$$y_{itjk} = \alpha + \beta_1 \text{industry Concentration}_{itjk} + \beta_3 \text{Strategic Risk}_{itjk} + \beta_4 \text{Environmental Dynamism}_{itjk} + \beta_5 \text{Adaptability}_{itjk} + \beta_6 \text{Alignment}_{itjk} + \beta_7 \text{Financial Crisis}_t + \beta_8 \text{Simultaneous Ambidexterity}_{itjk} + \beta_9 \text{Sequential Ambidexterity}_{itjk} + \beta_{10} \text{Simultaneous Ambidexterity} * \text{Env. Dynamism}_{itjk} + \beta_{11} \text{Simultaneous Ambidexterity} * \text{Strategic Risk}_{itjk} + \beta_{12} \text{Simultaneous Ambidexterity} * \text{Ind. Concentration}_{itjk} + \beta_{13} \text{Sequential Ambidexterity} * \text{Env. Dynamism}_{itjk} + \beta_{14} \text{Sequential Ambidexterity} * \text{Strategic Risk}_{itjk} + \beta_{15} \text{Sequential Ambidexterity} * \text{Ind. Concentration}_{itjk} + \beta_{16} \text{Controls}_{itjk} + \sum_t^n \beta_t \eta_t + \sum_j^m \beta_j \zeta_j + \sum_k^r \beta_k \omega_k + \varepsilon$$

#### 4.5. Measures

The first three chapters explained the existing literature related to slack-performance relationship. This section details how the models that are to be subjected to hypotheses are interpreted by variables. As indicated in the first chapter, the overall research objective of the thesis is to establish a link between slack profiles and performance heterogeneity in the time of financial crisis. This study is concentrated on characteristics of slack resources and attempts to apprehend these through the utilization of financial accounting-based data. However, the interaction processes

*“requires a story that narrates a sequence of events that unfolds as strategy changes over time. To study them requires the diagnosis of patterns in observable activities, events, or behaviours over time ... using the chronological order of events as data”* (Ferrier, 2001:859, Van de Ven, 1992:170).

This abstract of adaptation process represents an important extension of methodology of previous literature that emphasizes interdependence between strategic action and financial requirements in terms of actions for resource allocation and adaptation processes. However, an aggressive attack or a conservative stand can be shaped by the financial crisis and it can be traced by measuring slack resources in different time periods.

Additionally, data structure allows tracing average industry performance status over time because firms tend to adjust their performance to the average industry performance, which effectively captures performance referent (Wiseman and Catanach, 1997). Furthermore, industry median and average industry performance both enable practical proxies for the performance referent in concept of return and risk average industry performance is proposed as the comparison standard in both research and practice (Wiseman and Bromiley, 1991).

In this study, a quantitative approach was employed, therefore, gathered sample data and used statistical techniques are all quantitative in their nature. The current study thus focuses on forms of slack as calculated by financial ratios.

Most recent slack measures were shown in Table 4.2:

Table 4-2 - Most Recent Slack Measures

Study	Sample	Industry	SIC Code	Type of Slack
(Marlin and Geiger, 2015)	S&P 500, Mid-cap 400, and Small-cap 600 (579 manufacturing firms and 173 trade firms)	Manufacturer	two-digit SIC code	Available Slack
				Recoverable Slack
				Potential Slack
(Lin, 2014)	Taiwan Economic Journal (656 publicly listed firms in Taiwan) (2000–2008)	Public Firms	N/A	Absorbed Slack
				Unabsorbed Slack Potential Slack
(Banalieva, 2014)	OSIRIS, 211 firms, (1991-2009)	Listed and unlisted of stock exchanges	N/A	High discretion slack
(Mousa and Reed, 2013)	EDGAR, 172 listed firms (2001-2005)	high-technology industry sectors	two-digit SIC code	financial slack
				financial slack
				Innovational slack
				Innovational slack
				Managerial slack
(Barreto, 2012)	Portuguese Ministry of Employment, 21 commercial banks, (1991-1994)	Commercial banking industry	N/A	Managerial slack
				Available
				Recoverable Slack Potential

(Bradley et al., 2011)	Swedish Government Office	Swedish Public firms	four-digit SIC code	Financial slack (as available slack)
				Recoverable Slack
				Potential Slack
(Vanacker et al., 2016)	Amadeus; 167,959 private firms; (2006-2009)	western and Eastern European countries	two-digit SIC code	financial slack
				HR slack
				Recoverable Slack
				Potential Slack
(Orlando et al., 2016)	Business Monitor; OSIRIS; Frost&Sullivan; Hoover; Market Line; Compustat ; Thomson - Public firms (2004-2008)	Energy Industry	N/A	Available (as absorb slack)
				Recoverable (as unabsorbed slack)
				Potential Slack
(Kuusela et al., 2016)	Compustat	USA -(S&P 1500 firms)	three-digit SIC code	Potential (as Financial Slack)
(Tsai and Luan, 2016)	Taiwan Economic Journal (TEJ) Financial Data Bank and the Corporate Governance Data Set; 230 firms; (2003-2007)	information technology and electronics industries	N/A	Available Slack (as Financil Slack)
				Potential Slack (as Financil Slack)
(Deb et al., 2016)	COMPUSTAT,CRSP, and I/B/E/S; 9,298 firms; (1993-2012)	utilities, financial institutions, governmental organizations	four-digit SIC code	Absorbed slack
				Potential slack
(Shahzad et al., 2016)	Kinder Lydenburg and Domini Socrates® database Compustat North America database; 1439 firms; (2005-2009)	Public corporations in USA	N/A	Working Capital Slack (as financial slack)
				HR slack
				Innovational slack

(Dong, 2016)	Compustat	Manufacturer	four-digit SIC code	Available Slack Potential Slack
(Josephson et al., 2016)	CRSP, COMPUSTAT, and French's personal website; 578 public firms; (1999-2011)	US publicly traded firms	four-digit SIC code	Financial Slack Strategic Slack Operational Slack
(Tyler and Caner, 2015)	COMPUSTAT; USPTO; 113 firms; (1997-2007)	U.S. bio-pharmaceutical industry	four-digit SIC code	available slack absorbed slack potential slack
(Wang et al., 2016)	R&D employment survey data, (NBER) patent data, Compustat; top 100 firms; (1997-2005)	top 100 R&D firms	four-digit SIC code	HR slack Financial slack
(Guha, 2016)	Factiva and Thomson Reuters.	Chemical and Allied products industry	four-digit SIC code	(unabsorbed or) Available Slack (absorbed or) Recoverable Slack Potential Slack
(Chakrabarti, 2015)	OSIRIS, Thomson Reuters SDC Platinum M&A database; 969 firms ;(1994-1999)	manufacturing firms	N/A	Financial slack
(Paeleman and Vanacker, 2015)	Amadeus, Fame, Thomson one banker, PATSTAT; 4715 European firms; (1994- 2009)	high-tech sectors		financial slack HR slack Potential slack Recoverable slack

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Study	Slack measure	Variable Type	Performance measures	Slack-Performance Correlation	Analyses
(Marlin and Geiger, 2015)	Current ratio, quick ratio, and workingcapital	Independent	ROA	Positive	Factor
	SG&A expenses/sales, ; R&D and capital expenditures/sales	Independent	ROS		Cluster
	Debt to equity ratio, debt to sales ratio, and debt to assets ratio	Independent			MANCOVA and ANCOVA
(Lin, 2014)	SG&A Expenses/Sales	Independent	ROA	Positive	Generalized least squares (GLS)
	Current Ratio	Independent			
	Equity to debt	Independent			
(Banalieva, 2014)	Cash/total assets	Independent	ROA	Positive	Fixed effects regression
(Mousa and Reed, 2013)	Working capital/Total assets		ROA	Negative	Cluster Anova
	Cash / Total assets	Independent			
	R&D/Total assets	Independent			
	Number of Patent/Total assets	Independent			Mancova
	Number of Managers/Total assets	Independent			Ancova
	Avg. number of managerial position/Tot.number of insiders	Independent			
(Barreto, 2012)	Deposits/Credit	Control	Market expansion		Generalized estimating equations (GEE)
	SG&A Expenses/Sales	Control			
	Equity/T.assets	Control			

(Bradley et al., 2011)	Cash reserves		(EBIT)		Feasible generalized least squares (FGLS)
	(accounts receivable) + (inventory)	Independent Control		Positive	
	Equity/T.assets	Control			
(Vanacker et al., 2016)	cash and cash equivalents/ total assets		Gross profit		Generalized estimating equations (GEE)
		Independent		Positive	
	number of employees/sales inventories and accounts receivables/total assets	Independent Control		Negative	
	Equity/T.assets	Control			
(Orlando et al., 2016)	Current ratio		Price/Book Value		Anova
		Independent		Positive	
	SG&A Expenses/Sales	Independent		Negative	Linear Regression
(Kuusela et al., 2016)	Equity/T.assets	Independent		Positive	
	Equity/T.assets	Independent	ROA	Positive	fixed effects Poisson model
					Heckman type two-stage Model
(Tsai and Luan, 2016)	Current Ratio		Sales growth		
		Independent		Positive	multiple regression
(Deb et al., 2016)	Debt/Total assets	Independent	risk-taking behavior		
	SG&A Expenses/Sales	Control	Tobin's q	Negative	dynamic fixed effects regressions
(Shahzad et al., 2016)	Debt/Total assets	Control		Positive	
	(Current assets) - (Current liabilities)		Corporate social performance		fixed-effects panel data regressions
	natural log of total number of employees	Independent		Negative	
	R&D/Sales	Independent		Positive	
				Negative	



(Dong, 2016)	Current Ratio Long-term debts/total assets	Independent Control	ROA	Negative	Generalized least squares (GLS)
(Josephson et al., 2016)	cash available/Total assets R&D/Sales Sales/ plant, property, and other assets	Independent Independent Control	ROA	Positive Positive	Generalized least squares (GLS)
(Tyler and Caner, 2015)	Current Ratio Working capital/Sales Equity to debt	Independent Independent Independent	NPI performance	Positive	Fixed-effects panel Poisson regression
(Wang et al., 2016)	natural logarithm of the number of R&D employees R&D expenses/total assets	Independent Independent	Tobin's q	Negative Positive	two-stage least squares (2SLS) method
(Guha, 2016)	quick assets= ( cash and marketable securities)/liabilities SG&A Expenses/Sales	Dependent Dependent			Random effects regres
(Chakrabarti, 2015)	price/earnings ratio Altman Z score	Dependent Independent	ROA	Positive	likelihood of growth reconfiguration
(Paeleman and Vanacker, 2015)	cash/Total assets number of employees /sales Debt/Total assets Inventory/Sales	Independent Independent Control Control	(EBITDA)		Generalized estimating equations (GEE)

Note

#### 4.5.1. Interpreting Performance Variables

##### *Tobin's Q (Investor Response)*

Higher Tobin's q ratio indicates higher future profit and value creation for firms (Humphery, 2014, Gompers et al., 2003). Tobin's q ratio echoes the firms' inherent value since it integrates expected future profitability shaped by its market value (Arend et al., 2014, Jayachandran et al., 2013, Chung and Pruitt, 1994). This ratio was chosen as the dependent variable since it is widely accepted accounting measure of firm operational performance. Tobin's q was used because it reflects investor response (Rubera and Droge, 2013).

Further, Tobin's q can be seen a better measure of firm profitability than other financial ratios, because it concentrates more on estimated long-term outcomes and reflects the lag between realized benefits and excess resources (Yang et al., 2014b, Dushnitsky and Lenox, 2006). The performance variable is the industry-adjusted Tobin's Q. It refers to the (Tobin's Q - average Tobin's Q) for all firms in its 4-digit SIC code. By following Humphery (2014), Tobin's Q was calculated as follows:

➤➤ Performance

$$Tobin's\ Q = \frac{(Total\ asset - Common\ Equity + Common\ Shares\ Outstanding \times price)}{Book\ Value\ of\ Assets}$$

Where the price is firm's share price 35 days before the announcement.

##### *Altman Z-score (Financial Distress)*

Higher z-score indicates lower adaptation with the environment. Z-score is a weighted composite measurement that was utilized for slack, market return and profitability (Chakravarthy, 1986, Short et al., 2007). Z-score is an indicator of listed manufacturing firms' likelihood of bankruptcy. In addition to this, it also represents strategic firm performance (Koh et al., 2014).

Z-score is often employed to detect firms in turnaround situations (Chen, 2015a, Barker III and Duhaime, 1997). Z-score<sup>135</sup> is also used specifically to help to measure financial slack as an indicator of whether a firm has low financial slack (Chakrabarti, 2015). Higher z-score also shows performance decline (*financial distress*) that poses a threat to firm survival (Barker III and Duhaime, 1997). Therefore, the level of z-score may determine firms' level of adaptability. Thus,

$$\begin{aligned} Z\text{-Score} = & 1.2(\text{Working Capital} / \text{Total Assets}) + 1.4(\text{Retained Earnings} / \text{Total Assets}) \\ & + 3.3(\text{Earnings Before Interest and Tax} / \text{Total Assets}) \\ & + 0.6(\text{Market Value of Equity} / \text{Total Liabilities}) \\ & + 1.0(\text{Sales} / \text{Total Assets}) \end{aligned}$$

#### 4.5.2. Interpreting the Slack Variables

*Market Value Slack (Market value / Book value)*

It indicates the degree of alignment with the shareholders. The higher the value (alignment with the shareholders) the higher is the operating slack by the firm. RBV advocates that an organization can only have a better market performance if such firm has superior firm resources that confers it competitive advantage. However, behaviour theory proposes that market-to-book value has potential to increase performance by absorbing external effects and by facilitating the alignment process.

Some economic perspectives also argues that firms with higher market value may provide additional flexibility and endurance against financial crisis (Faulkender and Wang, 2006), and thereby increasing firm performance and shareholder wealth and implementing strategies that improving its market effectiveness and efficiency.

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<sup>135</sup> However, firms with low level of –score shows that firms are less liable to participate in risky actions (Patel and Cooper, 2014a).

The industry-adjusted MTBV refers to the (MTBV - average MTBV) for all firms in its 4-digit SIC code. Thus, MTBV was calculated as follows;

» *Market-to-Book Value*

$$= \frac{(\text{MarketPrice} - \text{Current})}{\text{BookValuePerShare}}$$

*Cash Slack (Cash/ Sales)*

Indicates the degree of alignment with the customers: the higher the value (alignment with the customers) the higher is the operating slack by the organization. Cash slack shows the level of current cash (Kraatz and Zajac, 2001). As a most fungible form of slack (Mousa and Reed, 2013), cash indicates a strong signal to investors. Cash refers to the level of most liquid and least absorbed form of slack (Mousa and Reed, 2013) that can easily be converted to other form of asset (Kraatz and Zajac, 2001) and deployed to various purposes (Mishina et al., 2004). Cash slack therefore has a great potential to offer a great degree of transferability to profitable activities (Mousa and Reed, 2013). The industry-adjusted cash refers to the (Cash - average Cash) for all firms in its 4-digit SIC code. Cash slack was calculated as follows:

» *Cash Slack*

$$= \frac{\text{Cash}}{\text{Total Sales}}$$

*Employee Slack (Sales /Employee)*

Indicates the degree of alignment with the employees. In other words, employee slack is the degree to which employees enjoy and feel committed to their work. A high degree of employee slack produces a great deal for firms. Higher is the value (alignment with employees), higher is the slack generating by the firm. Additionally, the degree of alignment with the employee determines the level of to what extent the employees give the best of themselves to current work. It also shows to what extent employees care about the future of the firm and to what extent they are prepared themselves to invest in it for which they work.

Employee slack is an indicator of positive effect of employees on their output and therefore indicator of organizational effectiveness (Ericksen and Dyer, 2005) and firm growth. The industry-adjusted employee refers to the (Employee Slack - average Employee Slack) for all firms in its 4-digit SIC code. Employee slack was calculated as follows;

$$\gg \text{Employee Slack} = \frac{\text{Net Sales or Revenues}}{\text{Total Sales}}$$

*Asset Utilization Slack (Sales/ Total assets)*

Asset utilization slack indicates the degree of alignment with firm's current and fixed assets. Higher is the value (alignment with firm's assets), higher is the asset utilization slack operating by the firm, which indicating that the firm is working close to capacity (Henriques and Sadorsky, 1996). It indicates the revenue-related advantages (Boone et al., 2016). In other words, asset utilization ratio measures the degree of ability to using asset efficiently and it is a "proxy for the loss in revenues attributable to inefficient asset utilization" (Rashid, 2015): 82) and how efficiently a firm manages its assets (Ang et al., 2000, Wellalage and Locke, 2011, Wang et al., 2011).

From a behaviour theory of firm perspective, asset utilization slack is a form of recoverable slack that improves a firm's overall performance and helps firms to create shareholder value (Garanina et al., 2016) by aligning perfectly with their current asset management. The industry-adjusted Asset Utilization refers to the (Asset Utilization - average Asset Utilization) for all firms in its 4-digit SIC code. Asset utilization slack was calculated as follows;

$$\gg \text{Asset Utilization} = \frac{\text{Net Sales or Revenues}}{\text{Total Assets}}$$

#### *Leverage Slack (Debt / Equity)*

Leverage slack indicates the degree of alignment with the financial environment. Lower is the value (alignment with financial environment), higher is the (potential) slack generated by the firm. Leverage slack indicates ability to increase external funds from the financial environment and accessibility to capital markets. The leverage slack facilitates a firm's alignment with the financial environment. Leverage slack also provides to adjust successfully to internal and external modifications and enables firms to deal with the problems may threaten survival (Bourgeois, 1981, Sharfman et al., 1988, Balcaen et al., 2011). The industry-adjusted leverage refers to the (Leverage - average Leverage) for all firms in its 4-digit SIC code. Leverage slack was calculated as following;

$$\gg \text{Leverage Slack} = \frac{\text{Total Debt}}{\text{Common Equity}}$$

#### *R&D Intensity Slack (R&D/Sales)*

The higher the intensity, the higher is the strategic slack. Indicates the degree of innovation taken by the company it may also refer to pursuing technological opportunities (Majumdar and Marcus, 2001). Firms can allocate some amount of operating slack available for development activities. Choosing the right amount of slack resources can help firms to create more technology intensive investments by improving the firm's future adaptability (Chang et al., 2014, Chao, 2011, Chrisman and Patel, 2012).

To extent that R&D intensity stimulates risk seeking, exploration, and experimentation, it can help future adaptability through creating various strategic options and increasing firm flexibility. In a similar vein, R&D intensity slack is necessary to increase firms' competitive advantage on the basis of innovation (Kim et al., 2008).

Hence, firms with greater R&D are expected to be in a better position to undertake risky initiatives and to implement adaptability to future uncertainty. The industry-adjusted R&D to sales ratio refers to the (R&D to sales ratio - average R&D to sales ratio) for all firms in its 4-digit SIC code. It was calculated as follows;

$$\begin{aligned} &\gg \text{R\&D Intensity} \\ &= \frac{\text{Research and Development Expenses}}{\text{Net Sales or Revenues}} \end{aligned}$$

*Working Capital Slack (Working Capital/Sales)*

Indicates the degree of investment in inventory and accounts receivable and payable. High values are generally associated with expanding firm market share (Vorhies et al., 2009). It can influence how companies seek advantage in evolving contexts (Geoffrey and Nohria, 2005).

*Working capital* can be defined as ability to meet firm's short-term commitments. (Bourgeois and Singh, 1983, Mousa and Reed, 2013).

It shows essentially the level of the activities and indicates investment in inventory, accounts receivable and payable, and assets needed to continue day-to-day operations. The level of working capital slack is a determinant on firm profitability and risk-level. The industry-adjusted working capital refers to the (Working capital - average Working capital) for all firms in its 4-digit SIC code Working capital slack was calculated as follows;

$$\begin{aligned} &\gg \text{Working Capital Slack} \\ &= \frac{\text{Working Capital}}{\text{Net Sales or Revenues}} \end{aligned}$$

*Dividend Slack (Dividend pay-out)*

The higher the ratio the higher is the strategic slack in dividends. Dividend pay-out may point to the extent to which the company is successful in its tactical aims at a particular time . Dividend is the provision that is attributable to the investors from investment of firms through the return of equity share capital.

Dividend is from the profit reaped by the firm operations after one year that is either re-invested back into the business as slack resources or distributed as dividend. Shareholders may demand greater part of the profit as dividend payment, whereas managers may demand to retain larger part of premium as slack for future investment rather than distributing to shareholders as dividend (Kajola et al., 2015). The industry-adjusted dividend refers to the (Dividend - average Dividend) for all firms in its 4-digit SIC code. Dividend slack was calculated as follows;

»» *Dividend Slack*

$$= \frac{\text{Common Dividends (Cash)}}{(\text{Net Income before Preferred Dividends} - \text{Preferred Dividend Requirement})}$$

*Inventory Turnover Slack (Sales/Inventories)*

High values indicate high investment of slack in inventory. It indicates the future demand for company's products/ services. Inventory slack or production capacity can be considered as absorbed slack (Du et al., 2014), which are committed to existing routines and cannot be convert to an alternative one easily (Sharfman et al., 1988, Sanchez, 1995), because absorbed slack increase firm inefficiency (Tan and Peng, 2003), and decrease firm flexibility (Mishina et al., 2004).

However, inventory slack shows resource fluidity that indicates ability to reconfigure internal operations for productive use (Doz and Kosonen, 2008, Doz and Kosonen, 2010). In this way, firms may reduce their adaptation period for environmental changes. Inventory has critical role in developing resource fluidity by dispersing and pooling similar resources through a central system. Its main benefit is to reduce idle time for resource flow (Du et al., 2014).



The industry-adjusted inventory turnover refers to the (Inventory turnover - average Inventory turnover) for all firms in its 4-digit SIC code Inventory turnover was calculated as follows;

» *Inventory Slack*

$$= \frac{\text{Cost of Goods Sold (excl. Depreciation)}}{(\text{Current Years' Inventories} + \text{Last Years' Inventories})}$$

Marketing Slack

High values indicate high-operating slack in overheads such as marketing expenses generally related to improving firm's reputation. The higher level of SGA expenses ratio can lead to inefficiencies for firms. The decision of adaptation strategies requires high level of SGA expenses for improvement and maintenance of the firm's strategic resources (Lev and Radhakrishnan, 2003, Chung et al., 2012, Wahlen and Wieland, 2011, Mackelprang and Malhotra, 2015, Cheng and Lin, 2012). The industry-adjusted SG&A refers to the (SG&A – average SG&A) for all firms in its 4-digit SIC code Marketing slack was calculated as follows;

» *Marketing Slack*

$$= \frac{\text{Selling, General and Administrative Expenses}}{(\text{Net Sales or Revenue})}$$

*Interpreting Adaptation*

Two different approaches were adopted in this study regarding measurements of adaptation. First, to measure effect of adaptation slack, single proxy variables were preferred. Second, factor score groups were used as proxy for alignment and adaptability.

#### 4.5.3. Interpreting Adaptation Slack

##### 4.5.3.1. Strategic Slack

To reflect operating slack, *R&D intensity* was used as a proxy to strategic slack. The focal motivation for this choice is that the complexity of using multiple variables at the same time. According to *DFA test*, R&D has highest factor score among strategic slack variables. DFA reported standardized canonical discriminant function coefficients that show contribution of R&D variables is ‘0.8995’. Thus, in order to facilitate and simplify the results, R&D over sales ratio was employed as proxy to strategic slack.

Another reason behind this choice is that using a single variable explains slack-performance relationship more clearly and thereby providing to more understandable findings. Nevertheless, R&D intensity slack enables firms to exploration activities, thereby facilitating long-term adaptability. R&D shows ease of adaptability to future environmental shifts, but may not be accepted as a short-term variable (Chen, 2008). In conclusion, greater level of R&D investment means greater level of strategic slack resources.

##### 4.5.3.2. Operating Slack

However, standardized canonical discriminant function coefficients that show second most contributor variable is *MTBV* with a value of ‘0.5307’ in DFA analysis. The ratio of market value to book value is often employed as measurement of growth as it is an appropriate proxy for current market activities (Fredrickson et al., 2010). It also shows that firms with higher market ratio indicates presence of having higher current opportunities and thus higher level of firm performance.

In addition, firms with higher market-to-book value will actively help firms to accumulate internal resources and that is one of the explanations of the possible positive relationship between alignment to current environment and firm performance. In conclusion, higher level of MTBV means greater level of operating slack resources when the environment is stable.

#### 4.5.4. Interpreting Adaptation Process

As a second option for measuring adaptation is to use composite slacks as proxy for alignment and adaptability. The EFA for strategic slack substitutes showed the factor score obtained the Eigenvalue of '2.288' in a single factor and of '1.395' in other factor loading. By following Lim and Mccann (2013)'s composite method, these slack measures employing total revenue were scaled and then normalized and summed these slack measures adjusted for company size in order to form the composite alignment and adaptability variables. Therefore, the first factor group was used as proxy for adaptability. Similarly, second factor group was used as proxy for alignment.

#### 4.5.5. Interpreting Environmental Variables

##### *Financial Crisis Dummy*

As financial crisis is proxied by a dummy, the crisis impact captured also encompasses the firm's response triggered by the financial crisis and its consequences on the resource allocation and business strategies. The dummy variable of financial crisis indicates whether crisis has significant implications on resource allocation and thus firm performance. Financial crisis was dummy coded '0' for the crisis period years of 2007 and 2008 and '1' otherwise.

### *Environmental Conditions*

Environment variables were developed following formulation for dynamism and munificence using 3-digit and 4-digit ISIC codes for the Western European manufacturer industries. Dynamism echoes the degree of environmental uncertainty and degree of changes (Bierly and Daly, 2007).

‘*Environmental munificence*’ is about the degree the industry environment may enhance continued growth (Bierly and Daly, 2007). In consistent with past studies (Ebeling et al., 2014, Grewal et al., 2013, Keats and Hitt, 1988, Walters et al., 2010, Xue et al., 2013), environmental munificence and dynamism are moderating variables of this study.

### *Munificence and Dynamism*

Dynamism describes the degree of environmental changes and the magnitude of instability in the environment. Environmental dynamism was calculated by dividing the sum of the sales for the four largest firms in each industry divided by the sum revenue of the industry from the prior two-year period, based on the 4-digit SIC codes. Dynamism was calculated as sum of four largest firms in each industry/ (t-2) total revenue of each industry based on four digits SIC code. Munificence refers to abundance of resources in the environment. Environmental munificence was calculated by the average industry sales growth rate during the 5-year period, based on the four-digit SIC codes. Munificence was calculated as average industry sales growth (5yr) based on four-digits SIC code.

#### 4.5.6. Interpreting the Risk Factors

Many studies<sup>136</sup> have argued that different risk-taking behaviours may be interested in different measures of performance and slack. The labels attached to the three risk factor groups are consistent with the notion that relevance of slack measure differs across firm adaptation. *Strategic Risk- (R&D, Capex, and Long-Term Debt)*-The first factor, *strategic risk index*, is widely viewed as the variable of risk most pertinent to firm slack investments. Its high loadings with positive signs of capital intensity and R&D intensity specify different strategic behaviours related to firm adaptation in the choice of investment.

Firm with higher capital intensity may have reduce average costs than a more production-intensive rival, but a firm investing heavily in R&D may show better dynamic efficiency in deployment of its resource available, or more resource flexibility than its rivals in adapting to changes in innovation and efficiency. Such trade-offs can be one of the main considerations in shaping a firm's adaptation profile. The greater loadings on the long-term debt ratio for sub-periods in the *strategic risk index* suggests that it may differ also be relevant to creditors (Miller and Bromiley, 1990).

*Return Risk*-The second factor, *return risk*, captures risk from the perspective of firm profitability. ROA and ROE show firm profitability<sup>137</sup> which a company makes with regard to its total resources in a historical perspective.

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<sup>136</sup> Some relevant references are (Bromiley, 1991, Christensen et al., 2014, Jackson and Wood, 2013, Li and Tang, 2010, Lim and Mccann, 2013, Miller and Chen, 2004, Reuer and Leiblein, 2000, Sharfman and Fernando, 2008, Tsai and Luan, 2016, Wiseman and Catanach, 1997).

<sup>137</sup> Reductions in firm profitability leads to many, typically hostile, executive actions, such as reductions in capital investment and increases in cost control (Bromiley, 1986). Nevertheless, stockholders with poorly adapted or misalign may apply resource reductions in investment decisions during the environmental jolt. Thus, firm return risk increases due to decreasing firm flexibility and number of investment options such as R&D and marketing expenses. In addition, if firms tend to be made a substantial reduction in firm resources, risk-averse managers will demand to maintain existing strategy with low return risk, and in general, firms with low return risk will have lower level of investment related slack resources than other firms. Assuming that is true, firm owners may value reductions in return risk because they enable a firm to have relatively better alignment with environment and thus

They are two of the most essential indicators for the measuring ability of generating earnings from investments and assess how successfully a firm is handling the capital that firm generates with the money shareholders have invested. Investors may eliminate firm risk through diversified strategic options.

*Operating Risk*-The third factor, *operating risk index*, captures risk from the perspective of short-term and current operating and market risks. According to Greenley and Oktemgil (1998), current ratio shows firm ability to create fungible slack for short-term obligations. Similarly, interest coverage refers to the presence of potential slack and shows firm ability to seek risky activities and to increase extra debt (Greenley and Oktemgil, 1998).

Chakravarthy (1986), Chakravarthy (1982) suggested that considering diverse slack resources are critical to creating valid measures of strategic adaptation (e.g., adaptive generalization and adaptive specialization). Given the findings of factor analysis propose that implied risk perspectives may underlie strategic choice of adaptive process measures as well. A slack-based interpretation of risk factors should, however, be strengthened by identifying that factor structure can be at least partially explained as an artefact of the creation of risk measures.

#### 4.5.7. Interpreting Ambidexterity Variables

In this thesis, ambidexterity construct was specified by developing a typology that identified two main perspectives that differentiate various uses of adaptation at firm-level in management literature. Particularly, a temporal dimension (sequential ambidexterity vs simultaneous ambidexterity) was identified, which in combination produce two essential types of ambidexterity.

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improve performance. Additionally, stable, satisfactory profits facilitate implementation of adaptation strategies easier.

Each ambidexterity perspective uniquely match with its theoretical antecedents and outcomes in order to show the potential of such typology. Firms can achieve resource ambidexterity in a *sequential fashion* by shifting level and form of slack resources overtime (Goossen and Bazazzian, 2012). However, if there is a highly dynamic environment that requires rapid changes, then sequential ambidexterity may be ineffective and managers need to use both alignment and adaptability processes in a *simultaneous fashion* (O'Reilly and Tushman, 2013).

The application of this typology to extant study assist to bring time dimension into the forefront and unify the several constructs into more comprehensive understanding of multidimensional concept. In doing so, it facilitates accumulation and allocation of slack resources by serving to reduce the confusing insights that arise from different periods of financial crisis. Furthermore, this type of ambidexterity (simultaneous vs sequential) helps firms to integrate related theories, matching operationalisations to concepts, test and improve hypotheses, and evidence on ambidexterity (Simsek et al., 2009).

A composition variable used to measure ambidexterity. Ambidexterity results increases a range of questions regarding how sequential and simultaneous ambidexterity should be normalized. Composite indicators are a combination of normalized variables. Saisana et al. (2005), Krishnan et al. (2016) and Bromiley et al. (2017) used same method to assess the quality of composite variables. The normalization technique was employed frequently in the past studies in order to standardize variables before calculating the composite variable (Krishnan et al., 2016). This technique rescale values by calculating the original values on a unit free scale between 0 and 1 (calculating as (original value –observed min. value) divided by (observed max. value –observed min. value)) (Saisana et al., 2005).

Ambidextrous firms were divided into two sub-samples based on their alignment and adaptability positions, initially, by using the median values of alignment and adaptability of firms, two sub-sample were generated, (1) simultaneous ambidexterity and (2) sequential ambidexterity. The researcher intended to use pre-crisis value of both ambidexterity characteristics. However, due to an insufficient number of observation, only general perspective was considered. To measure ambidexterity, alignment and adaptability were used as baseline variables.

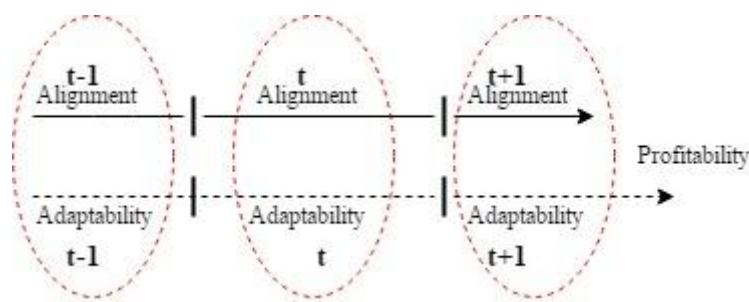


Figure 4-2 –Simultaneous Ambidexterity

Regarding measure of simultaneous ambidexterity, prior studies was relied on to determine the best proxy for alignment and adaptability. Simultaneous ambidexterity was operationalize as the alignment and adaptability (composite slacks) higher than median (p50) in time  $t$  (see figure 4.1).

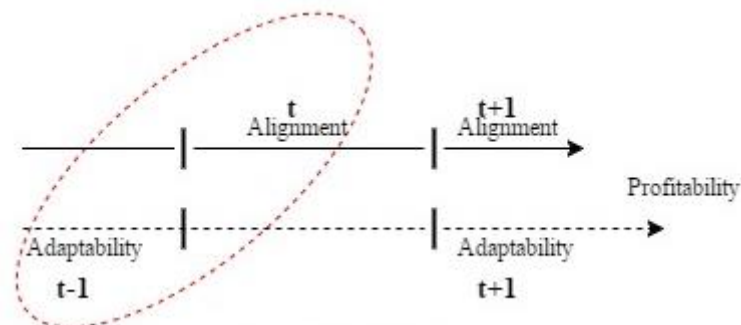


Figure 4-3 – Sequential Ambidexterity



However, sequential ambidexterity was operationalize as alignment higher than median (p50) in *time t-1* and adaptability in time *t*. Thus, in consistent with Venkatraman (2007), thus, given method enables to derive precise yearly measurements of alignment and adaptability practices and resource ambidexterity (see figure4.2).

#### 4.5.8. Interpreting Control Variables

##### *Firm Size*

However, firms with large size are more likely to possess bureaucratic inertia and rigidity and thus, it can be said that size is directly proportionate to resistance to change. The larger size firms might be more rigid and inflexible. Therefore, relationship between size and change is more likely to be negative since larger firms are more rigid and more bureaucratic. However, larger firm's investment in fixed assets is not easily transferable to other forms of liquid assets (Tan and See, 2004). Therefore, firm size should be controlled.

The previous studies indicated that firm size might affect the investment and innovation processes (Bradley et al., 2011b). Similar with past studies (George, 2005: Bradley et al. 2011), it was measured as the *natural log of total assets*.

##### *Firm Age*

Firm age is one of the most important indicators of growth prospects, as well as it affects the long-term performance (Srivastava and Laplume, 2014). It was controlled since previous research (Bierly and Daly, 2007, Srivastava and Laplume, 2014) has shown the influence of firm age on firm performance. Nevertheless, there is no strong evidence regarding whether firm age eases or restrains firm performance to be more effective at alignment and adaptability processes.

Older firms have many idiosyncratic advantages such as more experience in developing new innovation and products to extend existing technological trajectories, building external connections and more production experiences (Srivastava and Laplume, 2014, Sørensen and Stuart, 2000). Older firms sometime can be more rigid, bureaucratic and create inertial pressures to obstruct them from searching new technological innovations.

In contrast, younger firms<sup>138</sup> need to experience market dynamism and industry recipes, and overcome how to measure up to average industry level. It is often argued that newer organizations are more relaxed and undisciplined in their behaviours to strategic decision-making (Anderson and Eshima, 2013).

#### *Industrial Concentration (HHI Index)*

In line with past research (Acar and Sankaran, 1999), ‘*Herfindahl-Hirschman index*’ (HHI) was used to measure industry concentration. HHI can be used to explain a complete picture of industry concentration. Lower value of HHI implies that the industry is very intensive and shared by many competing firms. Contrary, higher level of HHI means that industry is intense in the hands of fewer companies. The most of the previous studies commonly used net sales to calculate market share. HHI was calculated as follows;

➤➤ Industry Concentration

$$Herfindahl_j = \sum_{i=1}^I S_{ij}^2$$

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<sup>138</sup> Conversely, new start-ups are more liable to try innovative and extreme technologies and have a tendency to be more accommodating because of their operational schedules (Bierly and Daly, 2007). Overall, younger and older firms differentiate from each other as a means of their organizational routines, processes and structures and cause biased results. To control this issue, the number of company-incorporated year and natural logarithm of firm age were used to eliminate effects of outliers.

Where  $S_{ij}$  is the market share of company  $i$  in the industry  $j$ . The above formula was performed to calculate each year for each industry, and then average the value over the 5 years.

#### *Sales Growth (Prior Experience)*

Sales growth can be considered an appropriate variable to measure prior performance of firms as a reference point. It was used in order to control industry effect in some models. The mean of sales growth was calculated for 4-digit SIC code as a scale, and then deducted from the industry average (Hou and Robinson, 2006).

#### »» *Prior Experiences*

$$Sales\ Growth = \frac{(SGrowth_t - SGrowth_{t-1})}{SGrowth_{t-1}}$$

## Summary

To sum up, the past chapter introduced some significant components of empirical study. The first two sections concentrated more on interpretation of dependent, independent and control variables. Furthermore, second section described data analysis, where the data details the sampling framing, industry classification, and unbalanced panel data consisting of western European manufacturer industries publicly listed firms within the context of the financial crisis of 2007-08 was defined. A third section described the econometric specification that are describe how to measure research variables, which includes a combination of multivariate and multiple regression analyses. The final section looked at econometric models.

# Chapter 5

## Introduction

This chapter begins with a determination of a period of financial crisis. Determination of time of crisis has a significant place for further analyses of study. Research will perform several multiple regression based on time of crisis. To increase of accuracy of findings, therefore, time-period of financial crisis must be detected precisely. To that end, an anova test was initially used to comparison of each year for whether there is any significant difference between them. Second, after determination of financial crisis, slack-performance relationship was analysed for before, during and after financial crisis. Third, linear and curvilinear relationship in between slack and performance was examined. Forth, sample data was split up as high performer and low performer and then differences of both groups were tested. Fifth, firm risk-taking capabilities were determined by using some multivariate tests and then regressed against performance variable as moderator. Finally, firm ambidexterity was separated as sequential ambidexterity and simultaneous ambidexterity and then regressed against firm performance variable.

## 5. Results

### 5.1. Determination of Financial Crisis

Sample data comprise three sub-periods representing financial crisis and environmental stability in between 2004-2013. ANOVA was used to test to understand whether any performance difference is existing throughout whole time-periods. Table 5.1 presents the result of ANOVA test across mean differences of Tobin's Q for each year. Only years in between 2007-2008 are statistically significant and such an effect decreases firm performance.

Table 5-1 – ANOVA for determination of financial crisis

Performance Variable (Tobin's Q, 2004-2013)

Year-Periods	F	$P>f$	Result
Between Y2004-Y2005	(-0.38)	-0.02	No Sig. Change
Between Y2005-Y2006	(-0.29)	0.02	No Sig. Change
Between Y2006-Y2007	(-0.19)	-0.01	No Sig. Change
<b>Between Y2007-Y2008</b>	<b>(-2.14)</b>	<b>0.100**</b>	<b>Significant Change</b>
Between Y2008-Y2009	(-0.69)	-0.03	No Sig. Change
Between Y2009-Y2010	(-0.65)	-0.03	No Sig. Change
Between Y2010-Y2011	(-0.79)	0.04	No Sig. Change
Between Y2011-Y2012	(-0.26)	0.01	No Sig. Change
Between Y2012-Y2013	(-0.14)	-0.01	No Sig. Change

t statistics in parentheses \*  $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

To support this finding, a 'line graph' was employed in axis of *sales growth* and *year* on particular industry and country. *Sales growth* rate is evaluated an important indicator for a company's profitability and survival. Figure 5.1 shows the sales changes for each of the western European countries overtime. It categorizes firm's tendencies responses by the geographical regions where the manufacturer firms are operating in. One noticeable result was observed in Figure 5.1 is that, around the Western Europe countries, firms slow down their sales during the crisis period.

According to figure 5.1, the crisis period (2007-2008) was identified as the most “turbulent” time-period with the average value of sales growth. In parallel with this finding, Figure 5.2 shows that almost all manufacturer industries<sup>139</sup> significantly reduced their sales growth. It was also observed that there has been a slowdown in sales growth during the crisis period (from onset of 2007 through end of 2008). Figure 5.1-5.2 confirm that in almost every country and industry have been affected from financial crisis and environmental change was detected only in between years of 2007-2008. Therefore, time-period of 2007-2008 was selected as best empirical proxy period that reflects financial crisis.

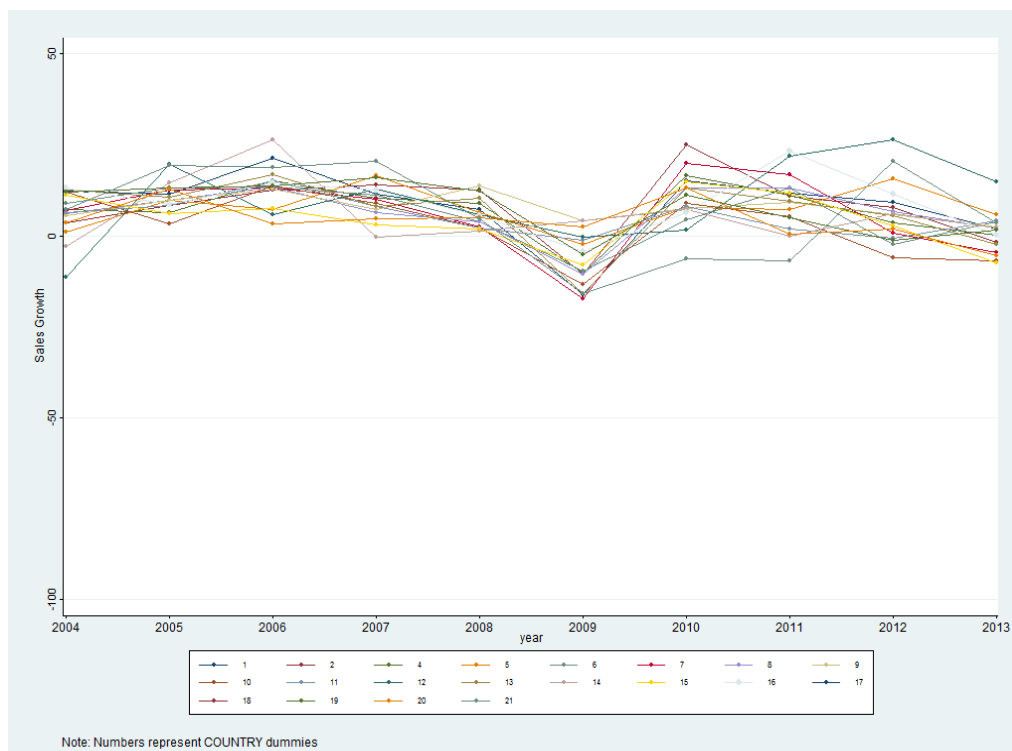


Figure 5-1-Performance changes over time in context of country

<sup>139</sup> (23 manufacturer industries) - Manufacturer industries were more generally illustrated in figure 5.2 in order to understand effect of financial crisis.

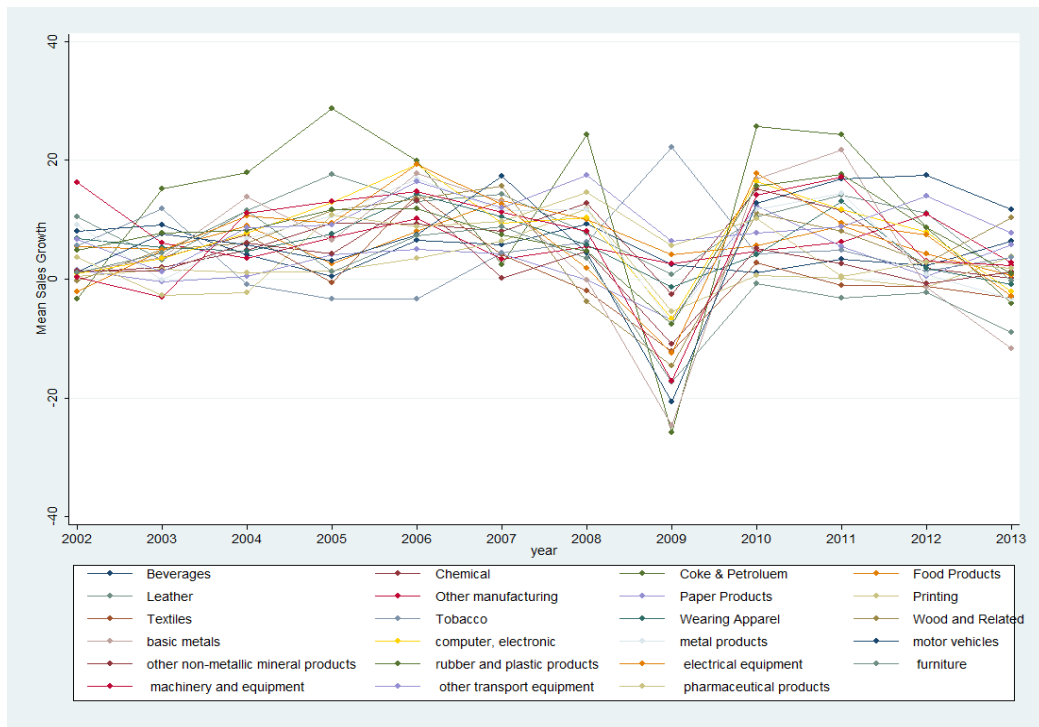


Figure 5-2- Sales growth changes overtime across manufacturer industries

As can be seen from both graphs above, financial crisis peaked in the year of 2007. Concern about the financial constraints led to a drop in financial resource demand for manufacturer firms later year of 2007 and it seems that its effect continued until end of 2009. While this decrease in resource availability could result from the financial crisis, it is also possible that it stems from an increase in resource commitment (demand) for investment purposes. The further analyses will investigate this point to reveal underlying factors that result in resource constraints during the financial crisis.



## 5.2. Financial Crisis, Slack –Performance Linear Relationship in General

### 5.2.1. Descriptive Statistics and Correlations for Slack Variables

Table 5.2 reports the sample mean, standard deviation and Pearson's correlation results among the slack variables used to test hypotheses. The correlation matrix demonstrates that there is no multi-collinearity and correlations among the main effects are unlikely to possess a series issue with multi-collinearity (Cohen et al. 2003). A variance inflation factor (VIF) test also applied and found that all the VIF scores below 3 and the average value was 2.45, far below the accepted serious level of 7 that is generally used rule of thumb for multicollinearity

Table 5-2 - Sample means, standard deviations, and Pearson's correlations for slack variables

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1 R&D Slack	1.23	1.06	1.00									
2 Working Cap. Slack	0.25	0.38	0.38*	1.00								
3 Dividend Slack	0.88	0.74	(-0.18)*	(-0.11)*	1.00							
4 Inventory Slack	0.27	0.20	0.27*	0.36*	(-0.08)*	1.00						
5 Marketing Slack	2.97	0.73	0.26*	0.21*	(-0.18)*	0.34*	1.00					
6 Market Value Slack	1.02	0.49	0.24*	0.05*	(0.18)*	0.01	0.12*	1.00				
7 Cash Slack	0.18	0.43	0.37*	0.41*	(-0.14)*	0.22*	0.27*	0.15*	1.00			
8 Employee Slack	11.89	0.90	0.12*	0.15*	-0.01	0.19*	0.00	0.07*	0.18*	1.00		
9 Asset Turn. Slack	1.00	0.49	0.02*	(-0.01)*	0.01*	0.01*	0.03*	0.02*	0.02*	(-0.01)*	1.00	
10 Leverage Slack	3.28	1.59	(-0.01)*	0.01*	0.01*	0.01	0.03*	0.01	0.01*	(-0.01)*	0.02	1.00

Note: Two-tailed tested; \*p<, 0.1. \*\*p<, 0.05. \*\*\*p <, 0.01.

Table 5.3 shows the average similarity of slack measurements between before, during and after environmental jolt. Firstly, it may be decided from table 5.3 that the average outcomes of most of the operating slack measurements are in declining during the jolt compared to before jolt and some of those are more notable than others. This demonstrates the fallout of the environmental jolt while companies' misalliance with the market grows. The outcomes in Table 5.3 revealed that companies as a whole lessened their R&D activities by 1.86 percent and 14.52 percent respectively during and after the jolt compared to before environmental jolt.

Similar reduction in their working capital is also evident both for during crisis and after crisis periods. These are expected since the firms generally attempt cost and investment cutting in the crisis period. There is a slight increase in dividend pay ( 6.4% ) during crisis reflecting PLCs desperate attempts to keep share prices stable but then consequently a reduction in dividends pay ( 12.1% ) after the crisis in order to improve the cash positions ( 5.19% ) and to manage the negative consequences of the crisis.

Pre-Crisis	Crisis	Diff.%			Crisis	Post-Crisis	Diff.%	
R&D Slack	1.35	1.33	-1.860	↓	1.33	1.13	-14.520	↓
Working Cap. Slack	0.25	0.25	-0.550	↓	0.25	0.25	-0.960	↓
Dividend Slack	0.90	0.96	6.400	↑	0.96	0.84	-12.120	↓
Inventory Slack	0.26	0.27	1.050	↑	0.27	0.27	2.910	↑
Marketing Slack	2.88	2.92	1.370	↑	2.92	3.04	3.930	↑
Market Value Slack	1.08	1.00	-7.840	↓	1.00	0.99	-1.360	↓
Cash Slack	0.19	0.17	-12.120	↓	0.17	0.18	5.190	↑
Employee Slack	11.89	11.88	-0.130	↓	11.88	11.89	0.090	↑
Asset Turn. Slack	1.01	1.00	-0.610	↓	1.00	0.99	-1.940	↓
Leverage Slack	3.29	3.35	1.860	↑	3.35	3.25	-2.840	↓

Table 5-3 - Mean comparison of slack for sub-periods

Drops in market to book value during (7.84 %) and after crisis (1.36%) reflects shareholders lack of confidence. Similar trends in asset utilisation ratios (0.6% and 1.94%) echo the reduction in sales during that period. Slight increase in inventory turnover during (1.05%) and after the crisis (2.91%) indicate firms' attempts to improve their working capital management.

It was also observed that SGA expenses increased nearly 1.37 % and 3.93 percent respectively during and post crisis periods, perhaps indicating the firms' desperate attempts to improve their sales in crisis. On the other hand, reductions in leverage 0.13% during the crisis indicate companies' attempts to reduce their debt burden during the crisis.

Finally, employee utilisation slightly increased during the crisis (1.86%) as this may be attributed to several lay-offs, a slight reduction was observed in employee utilisation ratios after the crisis and this may be due to further reduction in company sales after the initial shock wave.

### 5.2.2. Slack and Performance Relationship in Different Periods

Analyses of slack-performance relationship begin with comparison of main performance variables in between before and after financial crisis in order to understand whether any significant differences are available. To that end, Tobin's q ratio and z-score variables have been separated as pre-crisis and post-crisis periods.

Table 5-4 - T-test for performance variable(s)

Test Statistics	Mean	(Prb > t)
<b>Tobin's Q</b>		
Pre-Crisis	1.358	0.316***
Post-Crisis	1.043	-6.53
<b>Z-Score</b>		
Pre-Crisis	3.138	0.278*
Post-Crisis	2.860	-2.19
N	3400	

The table shows the result of the multiple regressions. Figures are regression coefficient estimates, and *t* values are shown in parentheses below coefficient estimates. \*\*\*, \*\*, \*, and y, respectively, indicate significance levels at 0.1%, 1%, 5%, and 10% levels. Year, industry and country dummies are included in all regressions.

Additionally, a parametric t-test was employed in order to understand magnitude of effect before, during and after environmental jolt on firm performance. The findings are demonstrated in Table 5.4. The organizations have suffered more significant losses and have been statistically relatively less taken advantage of after environmental jolt compared to the before environmental jolt. The results from the t-test endorse that a major effect exists of the crisis of 2007-08 on company operation.

This findings show that there are significant differences between before and after financial crisis values of Tobin's q, sales growth and z-score. Next regression is related to relationships of slack variables and performance variable.

Table 5-5 - FGLS model for slack and performance relationship in different time-periods

	Model 1		Model 2		Model 3		Model 4	
			Pre-Crisis		Crisis		Post-Crisis	
			(Anticipatory)		(Responsive)		(Readjustment)	
<i>Financial Crisis</i>	-0.17***	(-5.60)						
R&D Slack	0.12***	-5.9	0.28***	-7.64	0.09***	-3.96	0.14***	-5.27
Working Cap. Slack	-0.033	(-0.44)	0.63***	-4.51	0.44***	-4.35	0.11	-0.77
Dividend Slack	0.05*	-2.50	0.28***	-6.64	0.13***	-5.01	-0.02	(-0.81)
Inventory Slack	0.29**	-2.87	0.14	-0.74	0.13	-0.86	0.32*	-2.10
Marketing Slack	0.15***	-7.3	0.03	-0.63	0.09**	-2.89	0.15***	-5.25
Market Value Slack	0.354***	-2.48	0.48***	-1.65	0.49***	-2.32	0.29***	-1.30
Cash Slack	0.319**	-2.67	0.17***	-3.44	-0.04	(-0.23)	0.01	-0.43
Employee Slack	0.15***	-7.04	0.16***	-3.58	0.14***	-5.01	0.14***	-4.97
Asset Turn. Slack	0.05*	-2.17	-0.03	(-0.70)	0.04	-1.29	0.05*	-2.05
Leverage Slack	0.02*	-2.40	-0.01	(-0.79)	-0.01	(-0.13)	0.03**	-3.0
FirmAge	-0.001*	(-0.96)	0.01***	-3.48	-0.01	(-0.71)	-0.01	(-0.69)
FirmSize	-0.06***	(-7.40)	-0.15***	(-8.27)	-0.04***	(-3.65)	-0.04***	(-3.94)
Constant	-1.93***	(-6.86)	-2.26***	(-4.19)	-2.86***	(-8.63)	-2.04***	(-5.62)
<i>df</i>	36		37		38		39	
<i>Wald <math>\chi^2</math></i>	909.23		1496.47		1064.36		2644.50	
<i>N</i>	1607		406		454		749	

The table shows the result of the FGLS regressions. Figures are regression coefficient estimates, and *t* values are shown in parentheses below coefficient estimates. \*\*\*, \*\*, \*, and y, respectively, indicate significance levels at 0.1%, 1%, 5%, and 10% levels. Year, industry and country dummies are included in all regressions. Standard errors are reported in parentheses. \*, \*\*, \*\*\* indicates significance at the 90%, 95%, and 99% level, respectively.

Table 5.5 displays the Feasible GLS estimations and reports the models that explain the influences of slack variables on firm performance (Models 1, 2, 3 and 4). Model 1 shows estimations of whole periods, which shows the contingent and pooled impacts of slack variables and financial crisis on the firm performance for whole period. Model 2, 3 and 4 introduce the slack-performance relationship in before, during and after financial crisis, respectively. Controls variables (age and size) show the expected signs or have insignificant relationship with performance. With respect to the hypotheses, Table 5.5 shows that Hypothesis 1a and 5a are supported.

The direct impact of slack varies from one form to another, as the results of all models in Table 5.5. It can be concluded from Table 5.5 that, despite the fact that the impact of majority of the variables of excess resources on firm performance are slightly declining during crisis period comparing to pre-crisis, they are positively correlated with performance and some of those are more significant than others. The marginal declines during crisis were most likely to occur due to the negative consequences of the financial crisis as the firms' mismatch with their environments increase. The findings show that firms with relatively high level of slacks have a higher firm performance level. In contrast, a high level of control variables possess negative impacts on organizational performance. Including the crisis variable in Model 1 only slightly effects the magnitude of the slack variables. The direction of impact depends on forms of slack variables.

Model 1 demonstrates the most of 'slack' variables are positively associated with firm performance. The impact of financial crisis is negative and significant by around -16%. This finding also support H5a that argues that financial crisis dummy has significant and negative impact on firm performance. All coefficients are statistically significant ( $p < 0, 05$ ), excepting working capital.

The crisis has a negative coefficient and shows that an increase of impact of financial crisis on the performance leads to negative output (-16%). This result supports hypothesis 5a-that financial crisis of 2008-09 affect firm's performance negatively.

Model 2 includes the 'slack' variables in pre-crisis period. Model 3 add the main effects for testing the impact of conforming adaptation behaviours on basis of slack variation on a firm's performance in crisis period. The results from Model 4 indicate the slack-performance relationship after the financial crisis. Among the significant controls, increases firms' size and firms' age impact firm performance negatively (Model 1, 2, 3 and 4). The overall result reported that almost all slack variables have positive relationship with performance at a significant level ( $p < 0.001, 0.05$ ) with a few exceptions. The findings of each slack variable was explained as follows:

*R&D*, there is reasonable continuity in R&D investment trends in 2008-2009. In terms of execution, a substantial decrease in R&D experiments occurred during crisis, while the firms continued to rise and consolidate its innovation position after crisis. R&D intensity declined by around 18 % (27% -9%) during the crisis and then increased 4% after crisis. The 18 percent decline may have occurred because the financial crisis enhances the real option value of investments forcing firms to take the proper steps about their investment decision during crisis and/or the negative impact of financial crisis.

This may have led to an environmental mismatch and therefore may have reduced the level of technological experimentations. Overall, R&D intensity has a positive effect on firm performance (11.9%) in Model 1. The intensity of R&D increases the performance (27 %) in Model 5 (9%) in Model 6, and (13.8%) in Model 4, respectively.

*Working Capital*, Model 1 and Model 4 show that firm working capital is not directly associated with firm performance. However, Model 2 and Model 3 report that working capital is significantly and positively interacted with performance before and during crisis. It was also observed a substantial slowdown, which is around 20 percent (63% -43%), in working capital during the crisis, which could be happened due to the fact that negative consequences of financial crisis.

*Dividend*, similarly, the dividend pay-out measure is favourably associated with increases in firm performance and across periods in the first three models (Model 1, 2 and 3) but not in model 4. Model 1 reports that firm's dividend pay-out and performance have a positive and significant relationship. There is a considerable decrease in impact of dividend pay by 7.3 percent in Model 2 on firm performance during crisis reflecting temporary halts in dividend payments when comparing to pre-crisis period (28.2 percent in Model 3).

*Inventory*, inventory increases firm performance in Model 1 around 28.4%. The coefficient of inventory is significant and positively associated with firm performance. With regards to sub-periods, inventory is only significant in post-crisis period. Model 4 indicates a significant and positive (32.4 %) effect of inventory on firm performance. During a liquidity crisis, firms characteristically tend to reduce inventories to free up cash that is crucial to enhance firm flexibility for achieving adaptability and crucial to avoid burden of crisis. The positive and significant effect of inventory on performance strongly supports existing of alignment in Model1.

*SG&A Exp.*, regarding the marketing expenses, the effect of SG&A on firm performance is statistically significant across the all models (except for pre-crisis period in Model 2). Yet Model 1 reports that marketing tactics have a consistent and it is significantly and positively interacted with performance (nearly 14.8 percent).

In general, SG&A expenses ratio amplifies the positive effect of marketing activities to improve a firm's sales during and after crisis and buffers the negative effect of the financial crisis effect on firm performance (9% in Model 3) by following an aggressively marketing strategy to achieve future alignment. Model 4 reports positive impact of marketing on firm performance by 14.2% after the crisis.

*MTB value*, the Model 1 provides a preview of all results regarding market to book value, concluding that the coefficient for (MTBV) is positive and it is significantly associated with firm performance. In Model 1, MTBV increases firm performance around 35 percent. In addition, it increases firm performance in pre-crisis (47% in Model 2) and kept increasing during crisis around 1 percent (48% in Model 3).

However, although it decreased around 20 percent (48%-28%) in post crisis, it still increases firm performance around 28 percent (see Model 4) after the crisis. Since MTBV reflects reputation of firms and firm's relative success in fulfilling the expectations of shareholders, drop in MTBV (around 20%) after crisis (1.36%) echoes shareholders lack of confidence.

*Cash*, the coefficients of cash are positive and significant by 31.9% in Model 1 and 16.9% in Model 2. Cash is not significant in explaining alignment of firms for the period of crisis. While the role of cash declines during the crisis, cash does not continue to be significant factor in crisis and post-crisis periods (see Model 3 and 4).

*Employee*, it seems to be an increasing influence of employee slack on performance. The sign of this relationship is positive and significantly associated in all models. In Model 1, employee increases firm performance around 15.3 percent. Model 2 shows *ex-ante* impact of employee utilization on firm performance by 15.8 percent.



In Model 3, there is a small reduction in impact of employee utilization during crisis (13.7%) due to initial shock wave of financial crisis. Employee utilization, however, slightly increased after the crisis (13.8) as this may be attributed to several lay-offs or further growth in company sales after the crisis.

*Asset turnover*, the overall impression is that firms are faced with inefficient asset turnover difficulties caused by financial constraints and negative consequences of financial crisis. Although positive sign of FGLS coefficients propose a positive impact of sale to asset ratio on firm performance, the influence of this variable is significant only after the crisis (5.3%). Model 1 also reports that asset turnover increases firm performance by 5.2% in general. However, there is no major link exists between sales to total asset ratio and performance in pre-crisis and during the crisis.

*Leverage*, the observable proof shows that the connection between Tobin's q ratio and leverage ratio is significant and positive (1.8%) in Model 1. The relationship between debt to equity ratio and performance is negative but not statistically significant before and after financial crisis. In Model 1, leverage increases firm performance after crisis by 2.8 percent. This may have happened because of the fact that firms plan to operate successfully mainly rely on their own internal resources of financing (retained profits).

Overall, it was found support for H1a that there are many positive links exist among a large number of slack variables and performance variable before, during and after financial crisis. Therefore, H1a and H5a accepted and H1b and H5b were rejected.

Table 5-6 - Pre-crisis slack impact on post-crisis performance

Performance = Post C. Tobin's Q	Model5		Model6		Model7	
*Pre-C. R&D Slack	0.4089***	-12.37			0.0643***	-3.75
Pre-C. Working Cap. Slack	0.171	-1.6			0.0693	-0.83
Pre-C. Dividend Slack	0.4059***	-10.21			0.0683**	-2.62
Pre-C. Inventory Slack	0.3035	-1.5			0.1721*	-2.5
Pre-C. Marketing Slack	0.1426***	-3.73			0.1134***	-4.21
Pre-C. Market Value Slack			0.8573***	-68.97	0.8941***	-73.45
Pre-C. Cash Slack			0.2684***	-5.71	0.3615**	-3.07
Pre-C. Employee Slack			0.0402***	-4.06	0.0267	-1.24
Pre-C. Asset Turn. Slack			-0.0259**	(-3.11)	-0.0056	(-0.28)
Pre-C. Leverage Slack			-0.0049***	(-29.39)	-0.0055***	(-14.40)
Firm Size	-0.1773***	(-13.09)	-0.0965***	(-12.52)	-0.1087***	(-10.07)
Firm Age	-0.0003	(-0.14)	-0.0001	(-0.01)	0.0026**	-3.22
Constant	-0.5119**	(-3.27)	-1.4209***	(-11.21)	-1.4399***	(-5.92)
<i>Df</i>	33		36		38	
<i>Wald <math>\chi^2</math></i>	1203.67		7837.46		7283.65	
<i>N</i>	426		1020		376	

The table shows the result of the FGLS regressions. Figures are regression coefficient estimates, and *t* values are shown in parentheses below coefficient estimates. \*\*\*, \*\*, \*, and y, respectively, indicate significance levels at 0.1%, 1%, 5%, and 10% levels. Year, industry and country dummies are included in all regressions. \*Pre C. refers to pre-crisis period.

On the other hand, findings which zoom in on the link between pre-crisis influence of resource heterogeneity on performance of after crisis and independent variables are shown in Table 5.6. However, in consistent with (Martin et al., 2015) Greenley and Oktemgil (1998) and Chakravarthy (1982), investment-related variables were separated from others and then regress against performance. By doing so, before performing factor analysis, researcher wants to determine whether any particular differences exist between both groups.

The full *regression* findings, which contain both country, industry and year *specific fixed effects* are not stated in the table 5.6. A number of overall comments on the subject of the estimation results are appropriate here. The estimation model fares quite well across most variables with the majority remaining steady over the assorted regressions tested.

The descriptive power of the estimations from first model to last model slightly increased and reasonable high, while the chi-square (*Wald  $\chi^2$* ) for all estimations are statistically significant. The R&D intensity –performance relationship is positive in both model 5 ( $\beta = 0.4089$ ;  $p < 0.001$ ) and model 7 ( $\beta = 0.0643$ ;  $p < 0.001$ ).

*Working capital* Working capital also is the constants of the capital invested entered models 5 and 6 with measurably insignificant level at 5% but positively which aligns with Bowman et al. (2005). The results show statistically significant and positively associated with dividend payout and firm performance ( $\beta = 0.4059$ ;  $p < 0.01$ ) in model 5 and ( $\beta = 0.0683$ ;  $p < 0.01$ ) in model 7. The findings indicate that dividend payout is a crucial factor influencing firm performance. This also indicates the higher the profitability of firms, the higher dividend payout. This therefore shows that dividend policy is relevant.

Turning to the factors posited to be related to inventory management, *inventory turnover* is associated with performance positively. However, interaction between inventory and performance is not statistically significant. ( $\beta = 0.4059$ ;  $p > 0.05$ ) in Model 1. On the other hand, Model 7 reports that the level of inventory has significant and positive interaction with performance. ( $\beta = 0.3035$ ;  $p < 0.05$ ). The findings also imply that more successful firms are likely to be more efficient in managing their inventory.

On a similar vein, SG&A expenses are positively associated performance in model 5 ( $\beta = 0.1426$ ;  $p < 0.05$ ). In addition, the coefficient of SG&A expenses is positive and it is significantly associated with performance in model 7 ( $\beta = 0.1134$ ;  $p < 0.05$ ).

*MTBV*, the simple model 6 predicts that firms with greater required performance value will have greater market's expectation of the firm's cash and earning power. The results show that MTBV is positively and significantly interacted with performance in general ( $\beta = 0.8573$ ;  $p < 0.05$ ) in Model 6.

These results hold even with the inclusion of other variables ( $\beta = 0.8941$ ;  $p < 0.05$ ) in Model 7. The findings show that the market value slack mainly echoes the firms in delivering robust growth and operating performance.

*Cash*, the cash slack and performance has positive relationship, in line with the view that organizations with future prospects will want to hold a cash balance. The results confirm with Tan and Peng (2003) and George (2005)'s findings that as an unabsorbed slack resource, *cash slack* significantly contribute to firm performance in Model 6 and 7. In both Model 2 ( $\beta = 0.2684$ ;  $p < 0.001$ ) and Model 7 ( $\beta = 0.3615$ ;  $p < 0.001$ ), interaction between *cash slack* and performance is positive and significant.

*Employees*, with all other variables are set at their means, model 2 ( $\beta = 0.0402$ ;  $p < 0.001$ ). However, model 7 is not statistically significant and therefore, sales per employee is not a significantly associated with firm performance ( $\beta = 0.0267$ ;  $p > 0.05$ ). Model 6 also estimates that each value increase in the sales per employee is positively associated with a positive and statistically significant increase in firm performance. This represents a 4% gain in model 6 in labour productivity over the means sales per employee.

*Asset Turnover*, as a measurement of financial efficiency, the sign of asset turnover ratio is negatively and significantly associated in model 6 ( $\beta = -0.0259$ ;  $p < 0.001$ ). However, similar to sales per employee, in model 7, there is not a significant relationship with performance while it is negative ( $\beta = -0.0056$ ;  $p > 0.05$ ). This ratio is a general measure of firm's efficiency of asset utilization. Therefore, findings show that firms seem firms in model 6 are more effective when using less their assets to generate revenue.

As regards leverage, the empirical findings also revealed that the coefficient of leverage ratio has a negative interaction with firm performance but model 6 reports that relationship is significant ( $\beta = -0.0049$ ;  $p < 0.001$ ). Similarly, the slope value of debt to equity ratio was interacted significantly and negatively with performance in model 7 ( $\beta = -0.0055$ ;  $p < 0.001$ ).

It seems that the investment of firms with higher reliance on external financing for investment and working capital needs was less negatively influenced in model 6 when comparing with model 6, although the both coefficients in model 6 and 7 is significant.

An increase in pre-crisis slack increases post-crisis performance. For example, pre-crisis R&D increase affects post-crisis performance around ( $\beta = 0.0643$ ;  $p < 0.001$ ). Similarly, ( $\beta = 0.0683$ ;  $p < 0.001$ ) for working capital; ( $\beta = 0.1721$ ;  $p < 0.001$ ) for inventory turnover; ( $\beta = 0.1134$ ;  $p < 0.001$ ) for marketing expenses; ( $\beta = 0.8941$ ;  $p < 0.001$ ) for MTBV; ( $\beta = 0.3615$ ;  $p < 0.001$ ) for cash; ( $\beta = -0.0055$ ;  $p < 0.001$ ) for leverage, respectively.

In general, table 5.6 shows that H2a is supported by almost all slack variables. On the contrary, H2b is partially supported by working capital turnover, sales per employee and asset utilization ratios. They have any significant relationship between post-crisis firm performances.

### 5.2.3. Difference between Different Types of Industries

The empirical analyses on inter-industry differences were also considered in this study. Porter (1980) assumed that the all the firms in a specific industry may be identical in an economic sense. Table 5.7 presents the aggregate descriptive statistics of slack resources over the entire manufacturing industries. The empirical analysis reports that a classification based on industries only partly reflects the actual operating and strategic slack variables belonging to these industries. When the same industrial thresholds for high and low performing firms are applied at the firm level, it was observed that substantial and significant intra-industrial heterogeneity regarding the adaptation. It was also observed that there is a significant similarity between firm-level and industrial classification reality as regards firm performance (see performance table). A major part of firms actually matches their respective adaptation profiles, while the others are not. As firm-level adaptation perspective, this distribution is very similar in the industry-level adaptation perspective when it is applied to firm performance. Thus, it seems that the analysis of impact of adaptation on firm performance needs to be carried out at industrial level as well as firm level. The detailed analysis of the performance of industries as shown in Figure 3.5 reveals that typical high and low performer industries such as manufacturer of basic metal industry is relatively dominated by low performer firms and vice-versa, while manufacturer of computer and electronic equipment industry is typically dominated by high performer firms. Two industries were used to capture whether any industry at different performance level has similar characteristics with any of adaptation profiles. Therefore, manufacturer of basic metal and manufacturer of computer and electronic industries were selected as a respective industry since they have highest and lowest performer groups.

Table 5-7 - Descriptive Statistics for Manufacturing Industries

Industries		R&D Intensity	Working Cap.	Dividend	Inventory	SGA Exp.	MTBV	Cash	Employee	Asset Turnover	Leverage
Beverages	Mean	0.25	0.233	1.084	0.346	3.241	1.106	0.103	12.398	0.983	3.236
	Median	0.057	0.08	1.48	0.16	3.376	1.066	0.043	12.319	0.932	3.582
	SD	0.652	0.477	0.701	0.373	0.529	0.553	0.153	0.772	0.483	1.543
Chemical	Mean	1.153	0.199	0.962	0.259	3.025	1.078	0.175	12.144	0.984	3.322
	Median	1.088	0.168	1.414	0.208	3.1	1.017	0.063	12.173	0.972	3.806
	SD	0.79	0.23	0.705	0.203	0.722	0.479	0.533	0.747	0.447	1.591
Food Products	Mean	0.474	0.11	1.011	0.166	2.731	0.915	0.095	11.965	1.01	3.348
	Median	0.305	0.066	1.456	0.141	2.686	0.876	0.032	11.925	0.961	3.787
	SD	0.562	0.331	0.715	0.122	0.675	0.431	0.266	0.996	0.507	1.57
Other manufacturing	Mean	1.383	0.343	0.756	0.366	3.483	1.093	0.181	11.641	0.998	3.354
	Median	1.501	0.281	0.000	0.32	3.516	1.04	0.113	11.66	0.938	3.698
	SD	0.952	0.337	0.769	0.24	0.67	0.493	0.318	0.53	0.521	1.511
Basic metals	Mean	0.34	0.164	0.821	0.246	2.281	0.788	0.053	11.972	0.967	3.279
	Median	0.23	0.142	1.248	0.213	2.35	0.739	0.038	11.966	0.854	3.791
	SD	0.385	0.254	0.736	0.14	0.705	0.411	0.055	0.629	0.535	1.593
Computer and Electronics	Mean	1.819	0.321	0.631	0.258	3.077	1.105	0.221	11.822	0.973	3.269
	Median	2.063	0.273	0.000	0.238	3.114	1.021	0.141	11.779	0.931	3.752
	SD	0.988	0.391	0.746	0.159	0.67	0.468	0.315	0.85	0.474	1.65
Metal products	Mean	0.825	0.249	0.988	0.193	2.792	0.84	0.141	11.592	1.003	3.174
	Median	0.596	0.185	1.445	0.182	2.925	0.755	0.093	11.52	0.954	3.553
	SD	0.736	0.367	0.733	0.114	0.807	0.452	0.186	0.715	0.453	1.587
Non-metallic mineral products	Mean	0.594	0.233	0.924	0.35	2.981	0.8	0.165	12.064	0.999	3.276
	Median	0.461	0.201	1.404	0.281	3.121	0.737	0.072	12.005	0.917	3.663
	SD	0.591	0.249	0.743	0.233	0.712	0.381	0.427	0.891	0.47	1.613
Rubber and plastics	Mean	0.618	0.108	1.121	0.19	2.738	0.961	0.097	11.571	1.016	3.106
	Median	0.487	0.115	1.435	0.182	2.731	0.879	0.047	11.516	0.985	3.433
	SD	0.577	0.27	0.628	0.081	0.464	0.478	0.284	0.745	0.487	1.478
Electrical equipment	Mean	1.378	0.275	0.807	0.212	2.933	0.89	0.177	11.406	1.056	3.269
	Median	1.281	0.169	1.229	0.203	2.971	0.85	0.065	11.591	1.003	3.709
	SD	1.134	0.409	0.739	0.092	0.759	0.445	0.401	1.173	0.508	1.554
Machinery and equipment	Mean	1.191	0.264	0.912	0.287	2.833	1.068	0.145	11.768	0.968	3.312
	Median	1.08	0.217	1.375	0.267	2.932	0.99	0.084	11.723	0.93	3.767
	SD	0.824	0.246	0.733	0.141	0.648	0.501	0.267	0.674	0.468	1.598

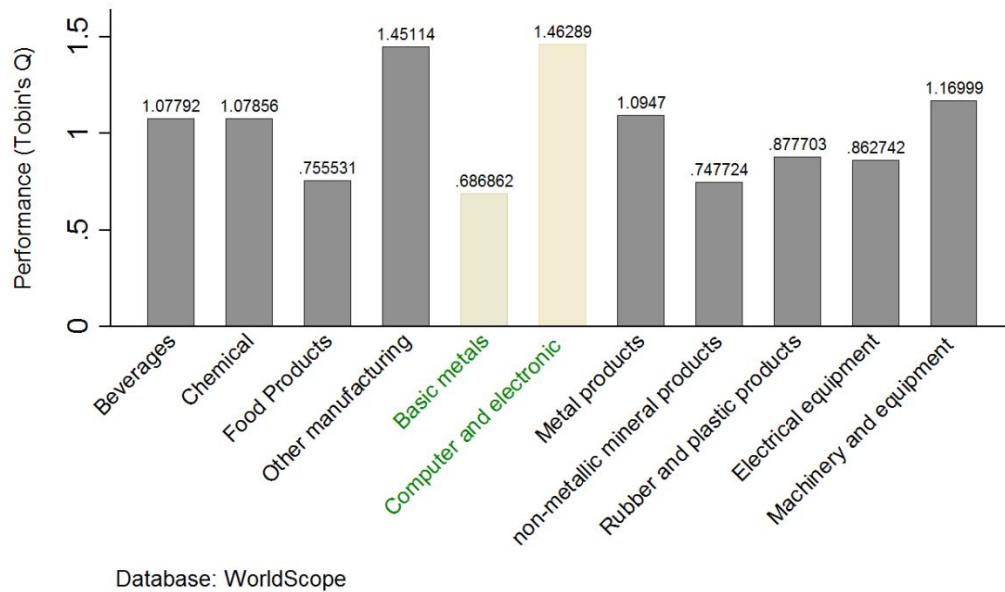


Figure 5-3 -Performance differences in between Manufacturing Industries

Table 5-8 -T-test for higher performing industries and lower performing industries

<i>Computer and Electronics vs.</i>	Food Products	Beverages	Chemical	Rubber and Plastic Products	Other Non-metallic Mineral Products	Metal Products	Electrical Equipment	Machinery and Equipment	Other Manufacturing
R&D	1.345*** -21.02	1.569*** -15.55	0.666*** -10.78	1.201*** -14.77	1.225*** -15.74	0.994*** -11.6	0.441*** -5.15	0.628*** -11.53	0.436*** -5.66
Working Cap.	0.211*** -9.76	0.088** -3.11	0.122*** -6.11	0.213*** -8.72	0.088*** -3.69	0.072* -2.53	0.047 -1.74	0.058** -3.27	-0.022 (-0.83)
Dividend	-0.380*** (-8.09)	-0.453*** (-8.35)	-0.331*** (-7.17)	-0.490*** (-9.32)	-0.293*** (-5.21)	-0.357*** (-5.84)	-0.176** (-3.25)	-0.281*** (-6.62)	-0.125* (-2.28)
Inventory	0.093*** -10.78	-0.088*** (-5.24)	-0.001 (-0.09)	0.068*** -7.13	-0.091*** (-7.32)	0.065*** -5.92	0.047*** -4.84	-0.029*** (-3.54)	-0.107*** (-8.28)
SGA Exp.	0.346*** -7.83	-0.164** (-3.07)	0.052 -1.11	0.339*** -7.13	0.096 -1.82	0.285*** -4.68	0.144** -2.61	0.245*** -6.08	-0.406*** (-7.96)
MTBV	0.190*** -7.05	-0.001 (-0.03)	0.027 -0.96	0.144*** -4.49	0.305*** -10.15	0.265*** -7.67	0.215*** -6.8	0.038 -1.43	0.013 -0.38
Cash	0.127*** -7.22	0.118*** -6.35	0.047 -1.88	0.124*** -5.96	0.056* -2.36	0.080*** -3.79	0.044 -1.9	0.077*** -4.87	0.04 -1.84
Employee	-0.143** (-2.61)	-0.576*** (-10.30)	-0.322*** (-6.69)	0.252*** -4.44	-0.241*** (-4.13)	0.230*** -3.7	0.416*** -6.33	0.054 -1.31	0.181*** -3.36
Asset Turn.	-0.037 (-1.30)	-0.01 (-0.32)	-0.01 (-0.38)	-0.043 (-1.33)	-0.025 (-0.81)	-0.029 (-0.85)	-0.083* (-2.54)	0.005 -0.21	-0.025 (-0.72)
Leverage	-0.079 (-0.82)	0.033 -0.3	-0.053 (-0.54)	0.164 -1.49	-0.007 (-0.06)	0.096 -0.79	0 0	-0.042 (-0.48)	-0.085 (-0.75)
N	1210	1040	1200	1040	1050	970	1040	1400	1020



<i>Basic Metals</i>									
<i>vs.</i>									
R&D	-0.134*	0.09	-0.812***	-0.277***	-0.253***	-0.484***	-1.038***	-0.851***	-1.042***
	(-2.59)	-1.38	(-11.95)	(-5.01)	(-4.66)	(-7.15)	(-11.70)	(-17.77)	(-14.55)
Working Cap.	0.054*	-0.070*	-0.036*	0.056*	-0.069***	-0.086**	-0.111***	-0.100***	-0.179***
	-2.34	(-2.18)	(-1.97)	-2.57	(-3.33)	(-3.08)	(-4.02)	(-5.58)	(-7.22)
Dividend	-0.190**	-0.263***	-0.141*	-0.300***	-0.103	-0.167*	0.014	-0.091	0.065
	(-3.08)	(-3.94)	(-2.33)	(-4.68)	(-1.48)	(-2.27)	-0.21	(-1.53)	-0.93
Inventory	0.080***	-0.100***	-0.014	0.055***	-0.104***	0.053***	0.034***	-0.041***	-0.120***
	-8.23	(-4.24)	(-0.99)	-5.78	(-6.76)	-4.74	-3.46	(-4.15)	(-7.39)
SGA Exp.	-0.450***	-0.961***	-0.745***	-0.458***	-0.700***	-0.511***	-0.652***	-0.552***	-1.202***
	(-7.83)	(-15.46)	(-12.23)	(-8.20)	(-10.61)	(-6.62)	(-9.37)	(-10.01)	(-18.95)
MTBV	-0.126***	-0.318***	-0.289***	-0.173***	-0.012	-0.052	-0.101**	-0.279***	-0.304***
	(-3.94)	(-7.77)	(-8.33)	(-4.73)	(-0.37)	(-1.36)	(-2.86)	(-8.86)	(-7.97)
Cash	-0.041*	-0.050***	-0.121***	-0.044**	-0.112***	-0.088***	-0.124***	-0.092***	-0.128***
	(-2.57)	(-5.19)	(-3.80)	(-2.67)	(-4.65)	(-7.13)	(-5.43)	(-8.51)	(-6.84)
Employee	0.007	-0.426***	-0.172**	0.401***	-0.092	0.380***	0.566***	0.204***	0.331***
	-0.1	(-7.01)	(-3.08)	-6.81	(-1.42)	-6.14	-7.23	-4.26	-6.5
Asset Turn.	-0.044	-0.017	-0.017	-0.049	-0.032	-0.036	-0.090*	-0.001	-0.031
	(-1.12)	(-0.40)	(-0.46)	(-1.17)	(-0.77)	(-0.83)	(-2.08)	(-0.03)	(-0.70)
Leverage	-0.069	0.043	-0.043	0.174	0.003	0.106	0.01	-0.032	-0.075
	(-0.57)	-0.33	(-0.35)	-1.35	-0.02	-0.76	-0.08	(-0.28)	(-0.57)
N	770	600	760	600	610	530	600	960	580

Figure 3.5 shows that computer and electronics manufacturers have higher level of slack resources. On the contrary, manufacturer of basic metal industries have lowest level of slack resources among manufacturer industries. Additionally, a student's t-test test was also applied, which uses the two-tailed distribution to determine whether there is a significant differences between these two industries (computer and electronics vs basic metal) and rest of manufacturing industries (see Table 5.8). Overall, findings demonstrate that the pattern of slack resources and firm performance differentiate across the different industries.

### 5.2.3. Adaptation Processes - Multivariate Tests

Factor and cluster analysis enabled to develop and operationalize the combinations of Chakravarty (1986)'s adaptation process dimensions and test their relationship with performance. Combining the two possible factor scores (high strategic/high operating, high strategic/low operating, low strategic/high operating, and low strategic/low operating) for each adaptation process gives as a result a total of four possible adaptation profiles.: *Ambidextrous firms* ( High operating slack – High strategic slack ); *Ambisinistrous firms* (Low operating slack – Low strategic slack ); *Alignment oriented firms* ( High operating slack - Low strategic slack ) and *Adaptability oriented firms* ( Low operating slack – High strategic slack ). Multivariate analysis begins with factor analysis.

#### 5.2.3.1. Factor Analysis (EFA)

After establishing the financial crisis period (2007-8) statistically, a factor analysis (principle components extraction method) was executed on all the slack measurements to show the triggering measurements among the slack measurements. In addition to reducing the number of uncorrelated factors in creating grouping the adaptation profiles, this method also helps us to remove multi-collinearity. The uses of factor analysis provided to identify variables through process of the factor separation and reduction and thus to identify adaptation processes.

Because of the fact that time-scope has implications on the adaptation capabilities, EFA was implemented on the whole periods. Factor loadings were computed and stored in an attempt to use in cluster analysis. To determine whether sample data is appropriate for the further analysis, KMO analysis was used. Overall result shows satisfactory KMO value that exceeds the threshold value of (0.5).

Table 5-9 - Factor analysis for slack resources

Factor(s)	Eigenvalue	Difference	Proportion	Cumulative
<b>Factor Group1</b>	<b>2.29</b>	<b>0.89</b>	<b>0.23</b>	<b>0.47</b>
<b>Factor Group 2</b>	<b>1.40</b>	<b>0.42</b>	<b>0.14</b>	<b>0.57</b>
<i>Factor Group 3</i>	<i>0.98</i>	<i>0.02</i>	<i>0.10</i>	<i>0.59</i>
<i>Factor Group 4</i>	<i>0.97</i>	<i>0.03</i>	<i>0.10</i>	<i>0.63</i>
<i>Factor Group 5</i>	<i>0.97</i>	<i>0.02</i>	<i>0.10</i>	<i>0.67</i>
<i>Factor Group 6</i>	<i>0.94</i>	<i>0.18</i>	<i>0.09</i>	<i>0.76</i>
<i>Factor Group 7</i>	<i>0.76</i>	<i>0.14</i>	<i>0.08</i>	<i>0.84</i>
<i>Factor Group 8</i>	<i>0.62</i>	<i>0.05</i>	<i>0.06</i>	<i>0.90</i>
<i>Factor Group 9</i>	<i>0.58</i>	<i>0.16</i>	<i>0.06</i>	<i>0.96</i>
<i>Factor Group 10</i>	<i>0.42</i>	<i>.</i>	<i>0.04</i>	<i>1.00</i>

Variable(s)	Factor1	Factor2	Uniqueness
R&D Slack	<b>0.76</b>	<i>0.14</i>	0.40
Working Cap. Slack	<b>0.69</b>	<i>0.08</i>	0.52
Dividend Slack	<b>-0.46</b>	<i>0.38</i>	0.65
Inventory Slack	<b>0.67</b>	<i>0.16</i>	0.52
Marketing Slack	<b>0.68</b>	<i>0.07</i>	0.53
Market Value Slack	<i>0.01</i>	<b>0.81</b>	0.34
Cash Slack	<i>0.19</i>	<b>0.34</b>	0.85
Employee Slack	<i>-0.19</i>	<b>0.61</b>	0.60
Asset Turn. Slack	<i>0.05</i>	<b>0.16</b>	0.97
Leverage Slack	<i>0.07</i>	<b>0.22</b>	0.95

**Factor loadings were identified, namely:**

***Factor1: “Adaptive Specialization”/ “Strategic Slack” = Adaptability***

***Factor2: “Adaptive Generalization”/“Operating Slack”=Alignment***

Estimation of the orthogonal factor model suggested two eigenvalues greater than one. Slack variables were loaded onto particular factors as suggested in the model. The top five variables in table 5.9 show the factor solution with Kaiser-normalization and varimax rotation. Factors with eigenvalues greater than one were stored for rotated factor pattern. Factor with varimax rotation resulted in the extraction of two factors, specified on the basis of a factor scores.

The better ‘uniqueness’ the lesser the relevance of the variable in the factor analysis. Cumulative indicates the total of variance explained by factors. For instance, factor1 and factor2 explain 57.1% of the total variance (recommended value closer to 1). The findings report that the sample data is matching the criteria adequately for factor analysis and confirm that there are two factor groups with regard to the number of adaptation processes; 1) process of adaptive specialization, 2) process of adaptive generalization.

The factor1 group consists of five slack measurements, namely, *R&D slack*, *working capital slack*, *dividend slack*, *marketing slack* and *inventory turnover slack*. The group1 was labelled as “*strategic slack*”<sup>140</sup>, resources invested to improve adaptability to future environments since all these variables, in general, mirror features that are linked to investment operations. The negative loading of dividend payout indicates scrambling for operative utilization of dividend payment.

The factor2 group (eigenvalue is 1.396) also consists of five slack variables; *MTBV*, *cash*, *asset per employee*, *asset turnover* and *leverage*. The second factor, “*operating slack*”, refers to resources resulting from the alignment with current environments (Gibson and Birkinshaw, 2004). However, factor scores of asset turnover and leverage are below that suggests a really weak relationship between the variables (Tabachnick et al., 2001).

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<sup>140</sup> The “adaptability” refers to “strategic slack variable”; “alignment” refers to “operating slack variable”.

The result of factor analysis confirms hypothesis 3a that argues that there are two distinct and statistically significant adaptation processes based on slack variables, namely alignment and adaptability. According to findings, alignment and adaptability are two significant distinct construct that underlie organizational adaptation overtime. For further confirmation of finding, following histogram and k-density matching was also applied to factor scores in figure 5.4.

Table 5-10 - ANOVA test for EFA groups

Measure	F	<i>P&gt;f</i>
R&D Slack	199.6***	0.00
Working Cap. Slack	29.3***	0.00
Dividend Slack	50.1***	0.00
Inventory Slack	13.8***	0.00
Marketing Slack	37.0***	0.00
Market Value Slack	246.1***	0.00
Cash Slack	48.6***	0.00
Employee Slack	1.40 ***	0.00
Asset Turn. Slack	0.7***	0.00
Leverage Slack	10.1***	0.00

Note: Standard errors are reported in parentheses. \*, \*\*, \*\*\* indicates significance at the 90%, 95%, and 99% level, respectively.

To confirm, statistically, the difference between two adaptation processes (factor1 and factor2), a one way ANOVA test was also applied for all slack variables (See Table 5.10). The results report that two factor groups differ sharply and consistent with the Chakravarthy (1986), it can be confirmed that there are independent two adaptation processes and each of processes has a unique character for strategy formulation.

Figure 5.4 demonstrates statistical differences of alignment and adaptability. It also shows comparison of the kernel density and the histogram estimate employing the same values. This simplified hypothetical illustration of a choice between two adaptation processes involving different forms of slack resources show how decision mediated by level of slack.

In this figure 5.4, level of resources are plotted along the *X-axis* and the corresponding probability densities of alignment and adaptability along the *Y-axis*. Figure 5.4 illustrates two different contexts, alignment and adaptability, for the adaptation; they correspond respectively to adaptation overtime.

A firm is faced with a simple choice between alignment and adaptability, black line area indicates resource commitment and red line (orange) areas indicates resource flexibility. The findings from figure 5.4 also shows that firms can accumulate excess resources after the deduction of committed resources. This finding also supports H3a that alignment and adaptability are distinct dimensions of adaptation process.

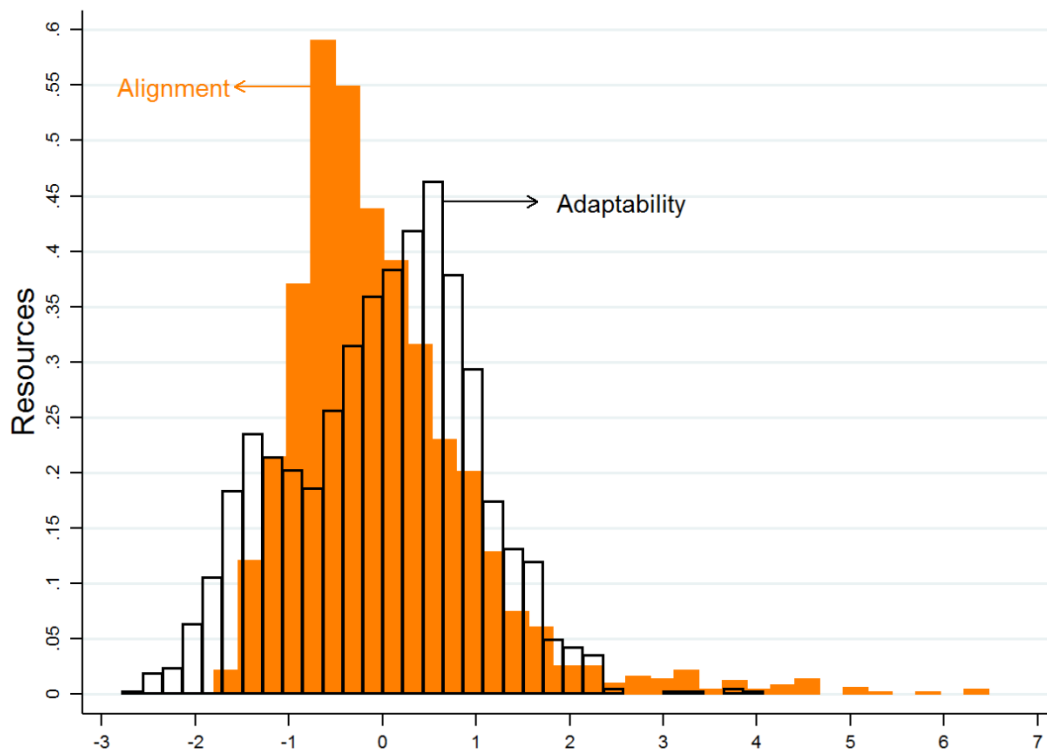
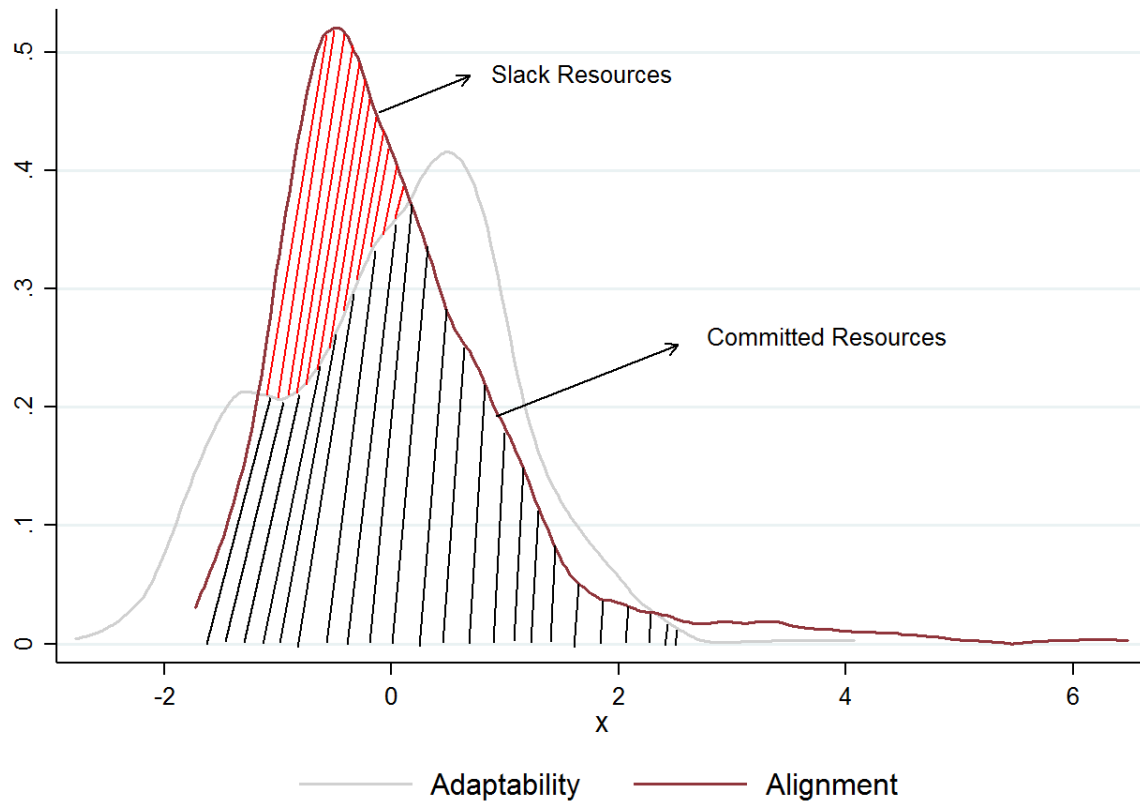


Figure 5-4 -K-density and histogram matching for alignment and adaptability

#### 5.2.3.2. Cluster Analysis

This section provides more detailed descriptive statistics for adaptation profiles by separating firms into sub-groups on the basis of adaptation processes and time periods. Initially, using the k-means cluster analysis, four sub groups of firms were generated, (1) *ambidextrous* (high operating slack-high strategic slack); (2) *ambisinistrous* (low operating slack –low strategic slack); (3) *adaptability oriented* ( low operating slack – high strategic slack); and (4) *alignment oriented* ( high operating slack- low strategic slack ). In the third stage of analysis, a *k-means cluster*, a non-hierarchical clustering technique, was performed on the factor scores in order to identify the adaptation profiles with a similar behaviour and/or profile pattern.

Cluster is a procedure for agglomerating firms into groups so that the homogeneous firms in a cluster are similar to one another (Sarstedt and Mooi, 2014). Consistent with the number of “factor groups”, four cluster solutions (ambidexterity, in-dexterity, adaptability, alignment) were chosen as the starting point. The resulting clusters within adaptation factor groups can be denoted as “adaptation profiles”.

It was also confirmed that “four adaptation profiles” are consisted of a combination of both constructs (adaptability and alignment). It has been chosen this technique over the hierarchical clustering model because hierarchical clustering does not produce all possible combination on the basis of “adaptability” and “alignment” processes. “appears to be more robust than any of the hierarchical methods” (Punj and Stewart, 1983): 139; (Slater and Olson, 2001) :1058). Table 5.11 confirms hypothesis 4a that argues that there are significant level of performance and slack differences among adaptation profiles.



Table 5-11 - T-test of slack variables for sub-periods

	Ambidextrous		Ambisinistrous		Adaptability oriented		Alignment oriented	
	I	II	I	II	I	II	I	II
R&D Slack	-0.09 (-1.11)	0.09 -1.03	-0.01 (-0.17)	0.18*** -5.52	0.01 -0.10	-0.06 (-0.63)	0.02 -0.19	0.15*** -4.15
Working Capital Slack	0.01 -0.24	0.00 (-0.01)	-0.02 (-0.62)	-0.01 (-0.25)	0.00 -0.03	-0.01 (-0.45)	-0.03 (-1.12)	-0.01 (-0.46)
Dividend Slack	-0.10 (-1.92)	0.02 -0.40	-0.01 (-0.07)	0.33*** -4.21	-0.03 (-0.54)	0.19*** -3.37	-0.05 (-0.65)	0.03 -0.48
Inventory T. Slack	-0.01 (-0.57)	-0.01 (-0.49)	-0.01 (-0.95)	-0.02 (-1.34)	0.00 (-0.09)	-0.01 (-0.83)	0.01 -0.98	-0.02 (-1.22)
Marketing Slack	-0.08 (-1.36)	-0.05 (-0.89)	-0.11 (-1.15)	-0.20** (-2.62)	-0.11* (-2.03)	-0.09 (-1.84)	0.10 -1.13	-0.30*** (-3.73)
Market Value Slack	-0.03 (-0.76)	-0.01 (-0.32)	0.06* -2.23	0.04 -1.55	0.07*** -3.94	-0.02 (-0.74)	0.04 -0.77	0.03 -0.44
Cash Slack	0.03 -0.79	-0.03 (-0.71)	0.03 -1.30	-0.02 (-1.49)	-0.02 (-0.63)	-0.02 (-0.63)	0.01 -0.32	-0.02 (-1.40)
Leverage Slack	-0.04 (-0.71)	0.01 -0.21	0.08 -0.87	-0.12 (-1.71)	-0.02 (-0.26)	-0.02 (-0.24)	0.09 -1.15	0.01 -0.12
Asset Utiliz. Slack	0.01 -0.26	0.05 -1.46	0.00 (-0.06)	0.04 -0.77	-0.02 (-0.49)	0.02 -0.70	0.05 -1.08	-0.08 (-1.81)
Employee Slack	0.13 -1.21	-0.08 (-0.71)	-0.47* (-2.17)	0.31* -2.01	-0.16 (-1.39)	0.15 -1.39	-0.07 (-0.36)	0.20 -1.20

T-statistics in parentheses \* p<0.05, \*\* p<0.01, \*\*\* p<0.001;

(I) shows between before and during financial crisis; (II) shows between during and after financial crisis

Table 5-12 - Mean comprison of cluster groups in different time periods

Whole Period					
	Ambidextrous	Ambisinistrous	Adaptability oriented	Alignment oriented	Total
R&D Slack	2.17	0.35	1.90	0.41	1.23
Working Cap. Slack	0.30	0.20	0.26	0.16	0.25
Dividend Slack	0.93	0.84	0.71	1.12	0.88
Inventory Slack	0.28	0.25	0.28	0.23	0.27
Marketing Slack	3.13	2.89	2.90	2.82	2.97
Market Value Slack	1.42	0.62	0.64	1.36	1.02
Cash Slack	0.28	0.11	0.16	0.10	0.18
Employee Slack	11.98	11.82	11.82	11.87	11.87
Asset Turn. Slack	1.01	0.99	1.00	0.98	1.00
Leverage Slack	3.32	3.33	3.22	3.27	3.26
Pre-Crisis Period					
	Ambidextrous	Ambisinistrous	Adaptability oriented	Alignment oriented	Total
R&D Slack	2.15	0.45	1.88	0.49	1.35
Working Cap. Slack	0.31	0.18	0.26	0.13	0.25
Dividend Slack	0.88	1.05	0.78	1.11	0.90
Inventory Slack	0.27	0.23	0.27	0.24	0.26
Marketing Slack	3.06	2.68	2.78	2.72	2.88
Market Value Slack	1.40	0.68	0.68	1.39	1.08
Cash Slack	0.28	0.11	0.14	0.10	0.19
Employee Slack	11.96	11.81	11.80	11.94	11.89
Asset Turn. Slack	1.03	1.01	1.00	0.97	1.01
Leverage Slack	3.37	3.20	3.17	3.33	3.29
Crisis Period					
	Ambidextrous	Ambisinistrous	Adaptability oriented	Alignment oriented	Total
R&D Slack	2.22	0.46	1.90	0.48	1.34
Working Cap. Slack	0.29	0.20	0.26	0.16	0.25
Dividend Slack	0.94	0.98	0.73	1.13	0.90
Inventory Slack	0.28	0.24	0.28	0.22	0.27
Marketing Slack	3.15	2.81	2.91	2.65	2.94
Market Value Slack	1.40	0.61	0.62	1.34	0.97
Cash Slack	0.26	0.08	0.15	0.10	0.17
Employee Slack	12.01	11.76	11.83	11.84	11.89
Asset Turn. Slack	1.00	1.00	0.99	0.92	0.99
Leverage Slack	3.29	3.48	3.30	3.23	3.32

Post-Crisis Period					
	Ambidextrous	Ambisinistrous	Adaptability oriented	Alignment oriented	Total
R&D Slack	2.16	0.25	1.92	0.32	1.08
Working Cap. Slack	0.30	0.21	0.26	0.18	0.25
Dividend Slack	0.98	0.71	0.65	1.13	0.86
Inventory Slack	0.30	0.27	0.28	0.24	0.27
Marketing Slack	3.18	3.00	2.99	2.96	3.05
Market Value Slack	1.45	0.61	0.64	1.36	1.01
Cash Slack	0.28	0.11	0.18	0.11	0.18
Employee Slack	11.97	11.86	11.82	11.85	11.88
Asset Turn. Slack	0.99	0.97	1.01	1.01	1.00
Leverage Slack	3.29	3.30	3.16	3.26	3.25

There are also other several significant observations that drew attention.

First, *ambidextrous* firms have the highest performance level compared to other three firm profiles studied and there are no significant changes on their performance across pre- crisis, during crisis and post crisis stages ( tables 5.12,5.13,5.14 and figure 5.5 and 5.6 ) This indicates the robustness and resilience of ambidextrous firms compared to the other three profiled firms throughout the crisis period.

Although statistically not significant, ambidextrous firms pay fewer dividends before the crisis period compared to during and after crisis periods. This may be attributed to compensate for the substantive amount of investments in R&D and working capital. Meanwhile as expected both operating and strategic slack variables are above the industry average and there are no major changes reported in their value throughout the crisis period (before-during – after).

This suggests that ambidextrous firms maintain stable adaptation profiles throughout the crisis period. This finding also supports *hypothesis 4b* that suggests that firms with higher firm performance will exhibit ambidextrous profile with more both operating and strategic slack resources than other adaptation profiles.

Second, the *ambisinistrous* firms have the lowest performance levels compared to other three firm profiles throughout the crisis period. Compared to *before* and *during crisis* periods they have significantly reduced their R&D investments, dividend payouts, SGA expenses and improve employee utilisation ratios after the crisis, demonstrating their cost reduction efforts.

The significant reduction in their market/ book value during the crisis reflects their poor performance levels throughout the crisis period. As expected, finding support *hypothesis 4e* that argues that firms with higher firm performance will exhibit ambisinistrous profile with a poorer operating slack and strategic slack resources than others.

Third, *adaptability oriented* firms have the second best performance throughout the crisis period after ambidextrous firms. (Tables 5.11, 5.12, 5.13 and figures 5.5 and 5.6) This may be due to the investing their slack resources before the crisis to create options and a capability base to deal with the vagaries of a crisis. Although their performance declines during the crisis period, they improve their performance after the crisis. Meanwhile there are no significant changes in their high R&D and working capital investments both during and after crisis periods compared to pre-crisis period indicating their commitment to high investment strategy.

This could also be partly due to the difficulty in recovering absorbed slack from R&D and working capital operations. Significant reduction in dividend pay-out during the crisis may be a case in point since reducing dividends is significantly easier than abandoning R&D and working capital investments. Meanwhile significant reduction in market-to-book values during a crisis period reflects firms lower performance levels in that period. Significance of reductions in SGA expenses during that period is an attempt to reduce the cost so to improve the post crisis performance.

This result rejects hypothesis 4c that argues that firms with the highest firm performance will exhibit adaptability-oriented profile with lower level of operating slack and higher level of strategic slack than other adaptation profiles.

Fourth, *alignment oriented* firms have lower performance compared to ambidextrous and adaptability oriented firms but perform better than ambisinistrous firms throughout crisis stages. Their performance drops during the crisis but then improves after the crisis (table 5.13 and figure 5.6). The relationship between higher levels of operating slack and lower level of strategic slack is not significant between pre-crisis and during crisis stages but there significant difference is observed in the levels of strategic slack during and after crisis stages.

This is somewhat expected, since organizations with accumulated slack resources, are less liable to encounter an emergency in changing their adaptation profiles during a crisis or their passive behaviour. As Miles & Snow argue alignment oriented firm is ideally suited for its environment only to the extent that the world of tomorrow is similar to that of today" (Miles and Snow, 1978:47).

However, the drop of performance during the crisis brings some level of urgency for the alignment-oriented firm to exercise further cost- cutting in R&D and SGA expenses (Tables 5.11, 5.12, 5.13) as a result improving cash position for quick response to the crisis. The findings reject hypothesis 4d that suggests that firms with highest firm performance will exhibit alignment-oriented profile with higher level of operating slack and lower level of strategic slack than other adaptation profiles.

Table 5-13 - T-test of performance for sub-periods

Ambidextrous		Ambisinistrous		Adaptability oriented		Alignment oriented	
Pre-C vs Crisis	Crisis vs Post-C	Pre-C vs Crisis	Crisis vs Post-C	Pre-C vs Crisis	Crisis vs Post-C	Pre-C vs Crisis	Crisis vs Post-C
0.16	0.09	0.11***	0.01	0.22*	0.02	0.11***	0.02
-1.2	-0.63	-3.55	-0.7	-1.74	-0.13	-5.08	-0.16

T-statistics in parentheses \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

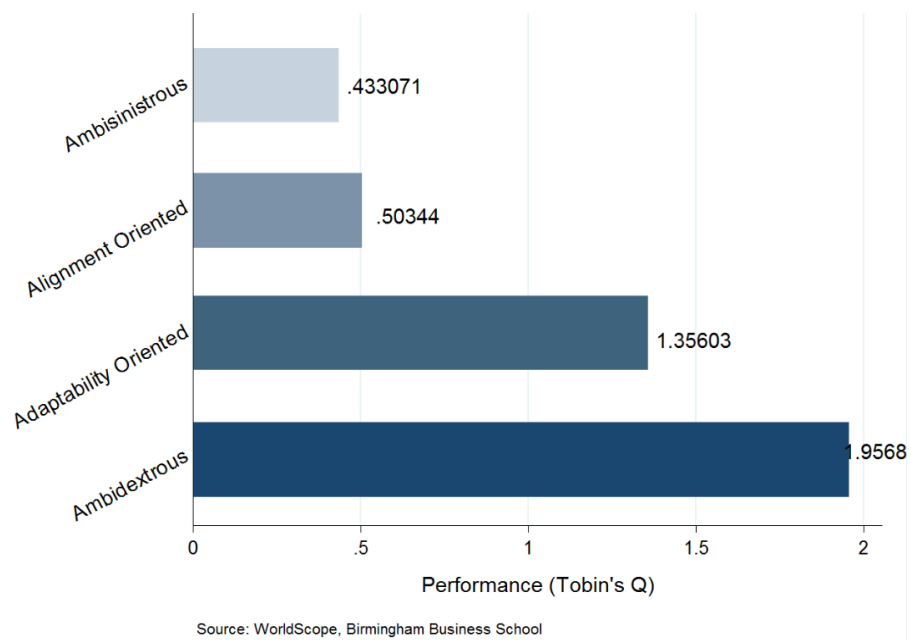


Figure 5-5 – Performances of Adaptation profiles

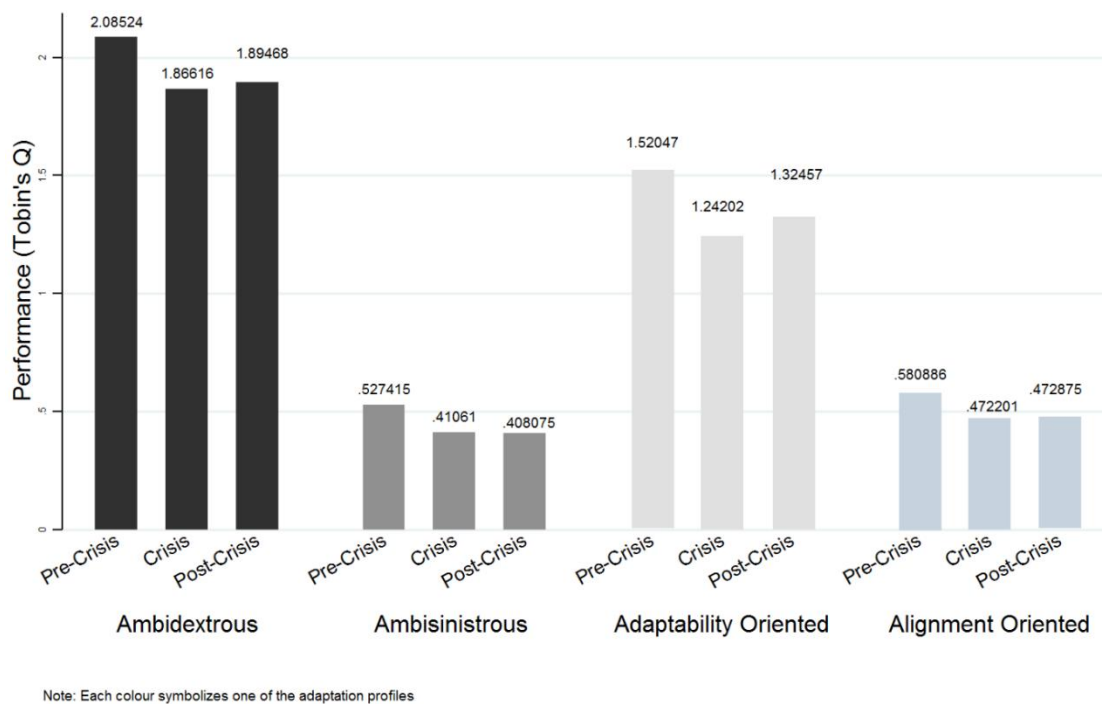


Figure 5-6 - Adaptation Strategies for whole period and Sub-periods

### 5.2.3.3. The Discriminant Function Analysis (DFA)

Discriminant function analysis (DFA) was also used to verify differences among adaptation profiles. Table 5.2 has reported Pearson's correlation coefficients and descriptive statistics for empirical variables. It demonstrates that all correlation coefficients are small enough that are not to be considered. The finding indicates that there is no problem of multi-collinearity for DFA.

Table 5-14 - ANOVA results among adaptation profiles

	<i>A-B</i>	<i>A-C</i>	<i>A-D</i>	<i>B-C</i>	<i>B-D</i>	<i>C-D</i>
R&D Slack	1.83*** (-56.9)	0.27*** (-6.28)	1.76*** (-53.43)	-1.56*** (-54.95)	-0.06*** (-3.52)	1.49*** (-51.14)
Working Cap. Slack	0.01 *** (-5.64)	0.04** (-2.62)	0.14*** (-7.53)	-0.06*** (-4.43)	0.04** (-2.73)	0.09*** (-6.93)
Dividend Slack	0.09* (-2.53)	0.218*** (-7.68)	-0.19*** (-5.95)	0.13*** (-3.58)	-0.28*** (-7.23)	-0.41 *** (-11.94)
Inventory T. Slack	0.04 *** (-3.32)	0.01 (-0.24)	0.049*** (-5.56)	-0.03** (-3.18)	0.02* (-2.33)	0.048*** (-5.48)
Marketing Slack	0.24*** (-6.85)	0.22*** (-7.79)	0.31*** (-8.53)	-0.02 (-0.53)	0.07** (-1.8)	0.091* (-2.49)
Market Value Slack	0.79*** (-54.48)	0.78*** (-68.88)	0.058*** (-3.40)	-0.02 (-1.82)	-0.74*** (-51.1)	-0.72*** (-61.24)
Cash Slack	0.18*** (-8.04)	0.12*** (-6.8)	0.175*** (-8.28)	-0.05*** (-3.42)	0.04 (-0.28)	0.05*** (-3.9)
Leverage Slack	0.16*** (-4.04)	0.16*** (-4.78)	0.106** (-2.75)	0.01* (-0.09)	(-0.05)* (-1.23)	(-0.05) (-1.37)
Asset Utiliz. Slack	0.02** (-0.10)	0.01* (-0.45)	0.028 (-1.29)	-0.01 (-0.64)	0.01* (-0.27)	0.018** (-0.92)
Employee Slack	-0.01 (-0.09)	0.11** (-1.89)	0.06** (-0.73)	0.11*** (-1.58)	0.056 (-0.69)	-0.06 (-0.79)

t statistics in parentheses \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

*A= ambidextrous, B= ambisinistrous, C= Adaptability oriented, D=Alignment oriented*

Before, DFA, an ANOVA test was also performed to confirm findings related to whether there are any significant differences in between adaptation profiles. Table 5.14 displays ANOVA results for the slack variables included in the analysis. It was found that there is no significant asset utilization difference in between “ambidextrous and alignment-oriented” and “ambisinistrous and adaptability-oriented” profiles.

Similarly, there is no significant ‘employee’ difference in between “ambidextrous and ambisinistrous”, “ambisinistrous and alignment-oriented” and “adaptability-oriented and alignment-oriented” profiles. It can be confirmed that the rest of the strategies for rest of slack variables are statistically significant.

For each of adaptation profile, DFA was also executed to understand the linear combination of profiles. DFA computes the posterior probability<sup>141</sup> that slack indicators are associated with the best appropriate adaptation profile. Table 5.15 reports the correlation of each slack variable and results of the four-group with discriminant functions. The findings in discriminant analysis are almost consistent with the analysis of the previous tests reported earlier, but in a *ceteris paribus* sense. DFA can also be regarded as a robustness test to support earlier findings with regards to adaptation profiles.

Table 5-15 - Discriminant analyses on adaptation strategies

	Standardized Canonical Coefficients			F Value	Prob>F
	function1	function2	function3		
R&D Slack	0.900	0.599	-0.020	118.670	0.000
Working Cap. Slack	-0.057	-0.111	0.740	49.516	0.000
Dividend Slack	0.137	-0.064	-0.345	48.841	0.000
Inventory Slack	-0.072	0.025	0.088	33.009	0.000
Marketing Slack	0.037	0.096	-0.517	33.469	0.000
Market Value Slack	0.531	-0.833	0.112	957.347	0.000
Cash Slack	-0.128	-0.004	-0.683	43.309	0.000
Employee Slack	-0.080	-0.084	0.333	3.051	0.028
Asset Turn. Slack	-0.038	0.038	0.134	1.018	0.384
Leverage Slack	-0.011	0.009	-0.229	24.050	0.710
	Canon. Corr.	Eigen-value	Wilks' Lambda	F	Prob>F
	0.84	2.38	0.14	178.79	0.000
	0.73	1.17	0.46	99.50	0.000
	0.19	0.16	0.79	15.79	0.012

<sup>141</sup> Discriminant function analysis is a different version of Bayes’ theorem that converts the prior probabilities of the different adaptation strategy groups  $\text{prob}(q) = \text{prob}(\theta, \sim\theta)$  into posterior group relationships. The adaptation strategy likelihood function (based on slack variables) initially need to be identified. Prior = 0.25 for the test.



An investigation of group means indicates that asset turnover and employee productivities discriminate groups the least effective than other slack variables. Additionally, rest of slack indicators demonstrate significant ( $p < 0.01$ ) influence to separate the four profile groups. Apart from these findings, the model test statistics of the discriminant function are: The Eigenvalue (2.379 ( $>1$ ), 1.170 ( $>1$ ), .160 ( $<1$ )), canonical correlations ( $r_c = .839$ ,  $r_c = .734$ ,  $r_c = .186$ ) and Wilk's lambda ( $= .136$  -  $p\text{-value} = 0.00$ ,  $= .458$  -  $p\text{-value} = 0.00$ ,  $= .794$  -  $p\text{-value} = 0.12$ ) for groups, respectively. An eigenvalue shows the proportion of variance explained.

The greater eigenvalue refers to stronger function. Canonical correlation shows correlation between the discriminant scores. A higher correlation indicates a better function that explains the variation well. Therefore, it can be said that functions explained well by profile groups. DFA also confirms hypothesis 4a regarding significant differences among adaptation profiles.

### 5.3. Financial Crisis, Environmental Conditions, Slack and Performance Curvilinear Relationship

Next, in order to scrutinize the '*nonlinear*' slack- performance interaction, operating and strategic slack were entered into the model. Two squared terms from these two variables were also created to analyse whether the damage of possessing slack ultimately overwhelmed the firm's performance gain. This study attempts to hypothesize a U-shaped curvilinear link between strategic, operating slack and performance from the aspect of financial crisis. The hypotheses were tested by the FGLS regression analysis. Table 5.16a reports operating and strategic slack – performance relationship in detail. Model 8, in Table 5.16a, is the baseline model comprising only of control variables and strategic and operating slacks variables. Findings indicates that the firm age and performance relationship is positive and significant ( $\beta = 0.0009$ ;  $p > 0.05$ ).

Model 8, in Table 5.16a, also captures the main effects of the explanatory measurements on the performance. Model 8 demonstrates that both coefficient of strategic and operating slack measures are significant ( $\beta = 0.1557$  for strategic slack;  $\beta = 0.7786$  for operating slack). After the addition of slack and its squared terms into the model, a significant improvement was observed in the model. Operating slack and strategic slack and their interactions with financial crisis were tested in model 10. In Model 9, both squared terms and interactions were reported together. Interaction terms shows simultaneous effect of relevant variables and created by multiplying these variables together.

The prior research results were supported by model 9, 10, and 11; a curvilinear relationship was observed between both adaptational slack forms and firm performance. In addition, firm size and age variable affect firm performance. Hypothesis 6a predicts that an inverse U-shaped nonlinear link between adaptational slack and performance. The outcomes corroborate hypothesis 6a that suggests a curvilinear slack-performance relationship. The slope for the squared values are negative, while for linear value of both strategic and operating slack are positive. These findings indicates a significant relationship for all terms. Furthermore, they evidently show a strong U-shaped influence of slack on firm performance.

For example, the results indicate that strategic slack displayed a nonlinear relationship. The constant betas of both operating and strategic slack show a positive and significant relationship (for operating slack  $\beta = 0.1926$ ;  $p < 0.001$ ; for strategic slack  $\beta = 1.4834$ ;  $p < 0.001$ ). the relationship between squared terms and performance is associated significantly and negatively significant (for operating slack  $\beta = -0.3059$ ;  $p < 0.001$ ; for strategic slack  $\beta = -0.0109$ ;  $p < 0.001$ ). As shown in the Model 9 of the Table 5.16a, the coefficient of the squared interaction terms between slack measures are also significantly associated with performance but the sign of coefficients are negative. The findings also strongly support hypothesis 6a and indicates that operating slack exhibits a curvilinear relationship with firm's performance.

Table 5-16 - FGLS regression analysis of slack and financial crisis

(a)

Performance = Tobin's Q	Model8		Model 9		Model 10		Model 11	
Industry ISIC 11	0.5643***	-10.19	0.6135***	-12.16	0.5646***	-10.2	0.6207***	-12.84
Industry ISIC 20	0.2512***	-7.17	0.2181***	-6.41	0.2517***	-7.18	0.2176***	-6.43
Industry ISIC 21	0.4493***	-9.88	0.4130***	-9.44	0.4505***	-9.9	0.4089***	-9.38
Industry ISIC 22	0.1657***	-4.11	0.1696***	-4.33	0.1667***	-4.14	0.1698***	-4.3
Industry ISIC 23	0.0083	-0.25	0.0423	-1.11	0.0096	-0.28	0.0412	-1.07
Industry ISIC 24	-0.0043	(-0.12)	-0.0058	(-0.16)	-0.0034	(-0.09)	-0.0049	(-0.14)
Industry ISIC 25	0.1993***	-3.39	0.1823**	-3.28	0.1984***	-3.37	0.1862***	-3.41
Industry ISIC 26	0.3221***	-8.07	0.2561***	-6.32	0.3215***	-8.06	0.2527***	-6.25
Industry ISIC 27	-0.0398	(-0.92)	-0.0698*	(-2.01)	-0.0382	(-0.88)	-0.0732*	(-2.24)
Industry ISIC 28	0.3780***	-11.2	0.3274***	-9.35	0.3783***	-11.2	0.3277***	-9.35
Industry ISIC 32	0.3020***	-5.34	0.2309***	-4.04	0.3029***	-5.35	0.2333***	-4.06
Co-Code 2	0.1475*	-2.24	0.1737**	-2.75	0.1483*	-2.25	0.1774**	-2.81
Co-Code 4	0.0864	-1.74	0.0715	-1.47	0.0864	-1.74	0.0731	-1.52
Co-Code 5	0.4171**	-2.93	0.3525*	-2.47	0.4213**	-2.95	0.3557*	-2.51
Co-Code 6	-0.0548	(-0.66)	-0.0671	(-0.97)	-0.0533	(-0.64)	-0.0534	(-0.77)
Co-Code 7	0.2617***	-4.57	0.2676***	-4.79	0.2616***	-4.57	0.2708***	-4.88
Co-Code 8	0.0011	-0.02	-0.0219	(-0.37)	0.0018	-0.03	-0.0209	(-0.36)
Co-Code 9	0.3751***	-7.28	0.3574***	-7.09	0.3743***	-7.26	0.3581***	-7.15
Co-Code 10	-0.1621**	(-2.93)	-0.1633**	(-2.98)	-0.1614**	(-2.91)	-0.1592**	(-2.92)
Co-Code 11	0.4011**	-2.81	0.1876	-1.61	0.4028**	-2.82	0.1942	-1.69
Co-Code 12	0.4878***	-5.11	0.4355***	-4.52	0.4884***	-5.12	0.4321***	-4.52
Co-Code 13	-0.1299*	(-2.41)	-0.1948***	(-3.41)	-0.1267*	(-2.35)	-0.1873***	(-3.29)
Co-Code 14	0.0252	-0.36	-0.0145	(-0.21)	0.0265	-0.38	-0.0103	(-0.15)
Co-Code 15	0.2004**	-3.02	0.2446***	-3.74	0.2041**	-3.08	0.2528***	-3.89
Co-Code 16	0.1066	-0.35	0.1173	-0.4	0.1107	-0.36	0.1214	-0.42
Co-Code 17	-2.0820*	(-2.03)	0.2508	-0.36	-2.1121*	(-2.06)	0.3525	-0.47
Co-Code 18	0.6025**	-2.67	0.6248**	-2.8	0.5999**	-2.65	0.6349**	-2.92
Co-Code 19	1.7447***	-8.16	1.6028***	-7.17	1.7438***	-8.16	1.6041***	-7.19
Co-Code 20	0.2753	-1.86	0.2215	-1.45	0.2755	-1.86	0.2053	-1.33
Size	-0.0265***	(-4.74)	-0.0260***	(-4.67)	-0.0269***	(-4.81)	-0.0265***	(-4.84)
Age	0.0009	-1.56	0.0015*	-2.56	0.001	-1.61	0.0015**	-2.61
Strategic Slack	0.1557***	-11.54	0.1926***	-6.28	0.1624***	-10.91	0.1890***	-6.3
Operating Slack	0.7786***	-11.8	1.4834***	-15.37	0.7922***	-11.14	1.6381***	-15.54
Strategic Slack (Square)			-0.0109	(-0.97)			-0.0092	(-0.82)
Operating Slack (Square)			-0.3059***	(-7.90)			-0.3398***	(-8.29)
Financial Crisis					-0.2221***	(-4.29)	-0.1962***	(-3.77)
Strategic Slack * Financial Crisis					-0.0243**	(-0.86)	-0.003	(-0.10)
Operating Slack * Financial Crisis					-0.0797*	(-0.47)	-0.4206*	(-2.28)
Constant	0.4120***	-5.68	0.3391***	-4.82	0.4052***	-5.57	0.3246***	-4.65
Degrees of freedom	42		44		44		46	
Wald chi-square	3159.3***		2640.52***		3149***		2893.17***	

N	2652	2652	2652	2652
Unstandardized estimates reported. Standard errors in parentheses. Slack variables indexed to industry average. * p < 0.05; ** p < 0.01; ***p < 0.001. Some industry and country dummies were omitted due to multicollinearity issue.				

...continued

(b)

	Model 12		Model 13	
Industry ISIC 11	0.5333***	-12.94	0.4700***	-10.02
Industry ISIC 20	0.1972***	-6.45	0.1676***	-5.16
Industry ISIC 21	0.3891***	-9.13	0.3795***	-8.42
Industry ISIC 22	0.0947**	-2.84	0.0658	-1.78
Industry ISIC 23	0.1333***	-4.41	0.0925**	-2.86
Industry ISIC 24	-0.0134	(-0.58)	-0.0691**	(-2.66)
Industry ISIC 25	0.1374**	-3.17	0.0654	-1.43
Industry ISIC 26	0.1274***	-3.52	0.1033**	-2.91
Industry ISIC 27	-0.0502	(-1.31)	-0.0765*	(-1.98)
Industry ISIC 28	0.4085***	-14.04	0.3248***	-10.37
Industry ISIC 32	0.1955***	-3.99	0.1841***	-3.53
Co-Code 2	0.1521*	-2.33	0.1112	-1.55
Co-Code 4	0.0656	-1.29	0.043	-0.76
Co-Code 5	0.2775	-1.7	0.2215	-1.35
Co-Code 6	-0.1269*	(-2.08)	-0.0891	(-1.26)
Co-Code 7	0.2597***	-4.62	0.2265***	-3.59
Co-Code 8	-0.0112	(-0.19)	-0.0697	(-1.09)
Co-Code 9	0.3708***	-7.32	0.3264***	-5.67
Co-Code 10	-0.1171*	(-2.24)	-0.1526**	(-2.58)
Co-Code 11	-0.0591	(-0.71)	-0.1037	(-1.14)
Co-Code 12	0.3769***	-3.94	0.3781***	-3.8
Co-Code 13	-0.2250***	(-3.95)	-0.2482***	(-3.93)
Co-Code 15	-0.0207	(-0.33)	-0.0694	(-1.03)
Co-Code 16	0.2825***	-4.59	0.3072***	-4.82
Co-Code 17	0.1531	-0.52	0.1039	-0.38
Co-Code 18	-0.4886	(-0.65)	-0.8452	(-0.78)
Co-Code 19	0.4873	-1.92	0.4331	-1.69
Co-Code 20	1.5618***	-8.64	1.4665***	-9.45
Co-Code 21	0.2592	-1.34	0.2346	-1.23
Size	-0.0285***	(-5.81)	0.0310***	(-6.21)
Age	0.0018***	-3.44	0.0016**	-3.06
Strategic Slack	-0.3200***	(-5.10)	-0.3044***	(-4.64)
Operating Slack	2.2515***	-11.46	1.2052***	-4.05
Strategic Slack (Square)	0.1268***	-5	0.1385***	-5.65
Operating Slack (Square)	-0.5000***	(-6.38)	0.1655	-0.69
Financial Crisis	0.0216	-0.73	0.015	-0.49
Strategic Slack * Financial Crisis	0.0015	-0.05	0.0018	-0.06
Operating Slack * Financial Crisis	-0.5974**	(-2.71)	-0.5254*	(-2.39)
Dynamism * Strategic Slack	0.8398***	-4.28	0.8282***	-4.2
Dynamism * Operating Slack	-2.6014***	(-5.47)	0.5292	-0.58
Dynamism * Strategic Slack (square)	-0.2080*	(-2.53)	-0.2535***	(-3.59)
Dynamism * Operating Slack (square)	1.3731***	-3.95	-1.6667	(-1.39)
Munificence * Strategic Slack	0.0315***	-6.88	0.0274***	-5.42
Munificence * Operating Slack	0.1073***	-5.91	0.3253***	-8.75
Munificence * Strategic Slack (square)	-0.0096***	(-4.79)	-0.0085***	(-4.00)
Munificence * Operating Slack (square)	-0.0973***	(-6.48)	-0.1916***	(-7.34)
Dynamism * Munificence			0.0109*	-2.06
Dynamism * Munificence * Operating Slack			-0.6739***	(-6.97)
Dynamism * Munificence * Operating Slack (Square)			0.4036***	-3.72
Constant	0.2947***	-4.97	0.3691***	-5.73
<i>Degrees of freedom</i>	48		49	
<i>Wald chi-square</i>	4254.41***		3967.38***	

N

2652

2652

Unstandardized estimates reported. Standard errors in parentheses. Slack variables indexed to industry average. \* p < 0.05; \*\* p < 0.01; \*\*\*p < 0.001. Some industry and country dummies were omitted due to multicollinearity issue. Co-Code refers to country identification.

These findings are mostly consistent with past studies (Nohria and Gulati, 1996, Tan, 2003, Bradley et al., 2011b) that suggesting for a curvilinear relationship adaptational slack forms and firm performance. Also found was a significantly negative interaction between strategic slack and financial crisis ( $\beta = -0.0243$ ;  $p < 0.001$ ). The relationship between operating slack and financial crisis is negative and significant ( $\beta = -0.0797$ ;  $p < 0.001$ ). Accordingly, this finding confirms both hypotheses 5a and 6a, respectively.

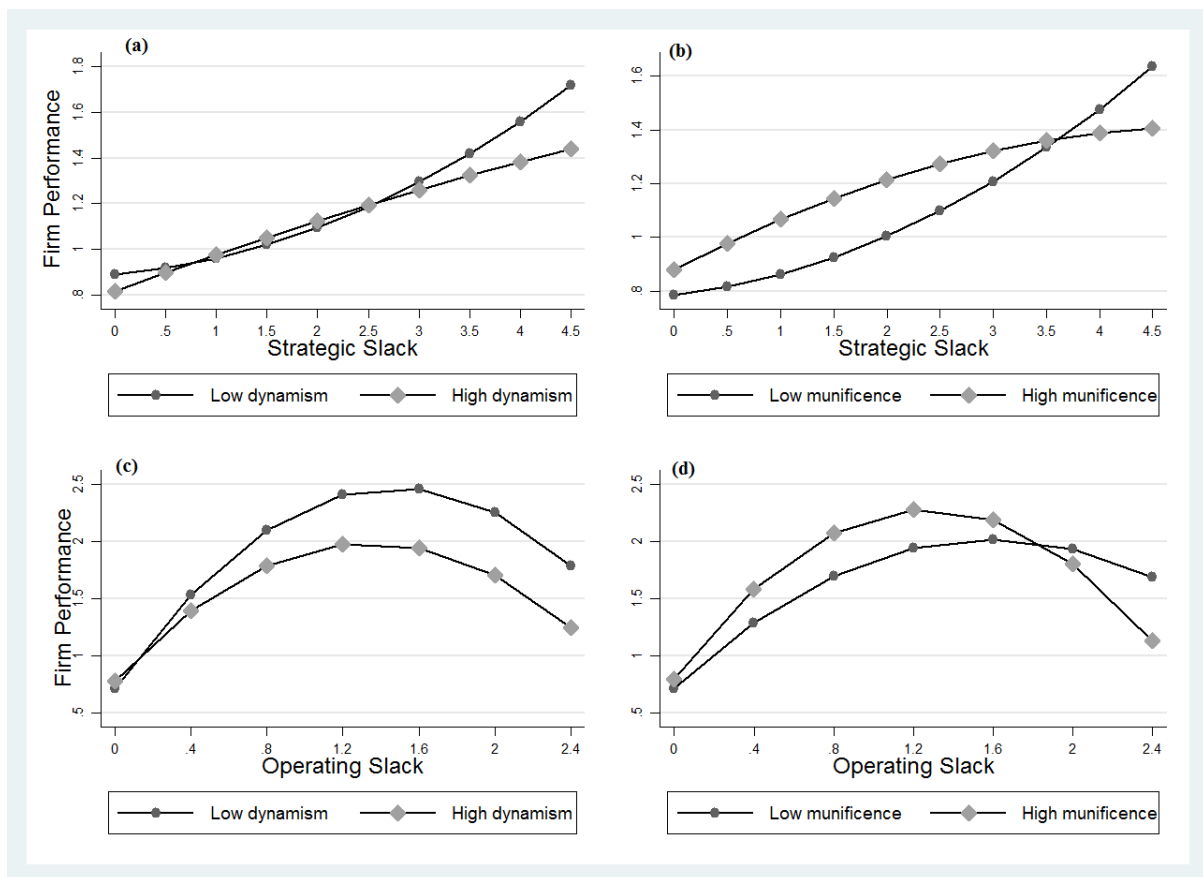


Figure 5-7 – Mediating effects of environmental conditions on slack-performance relationship

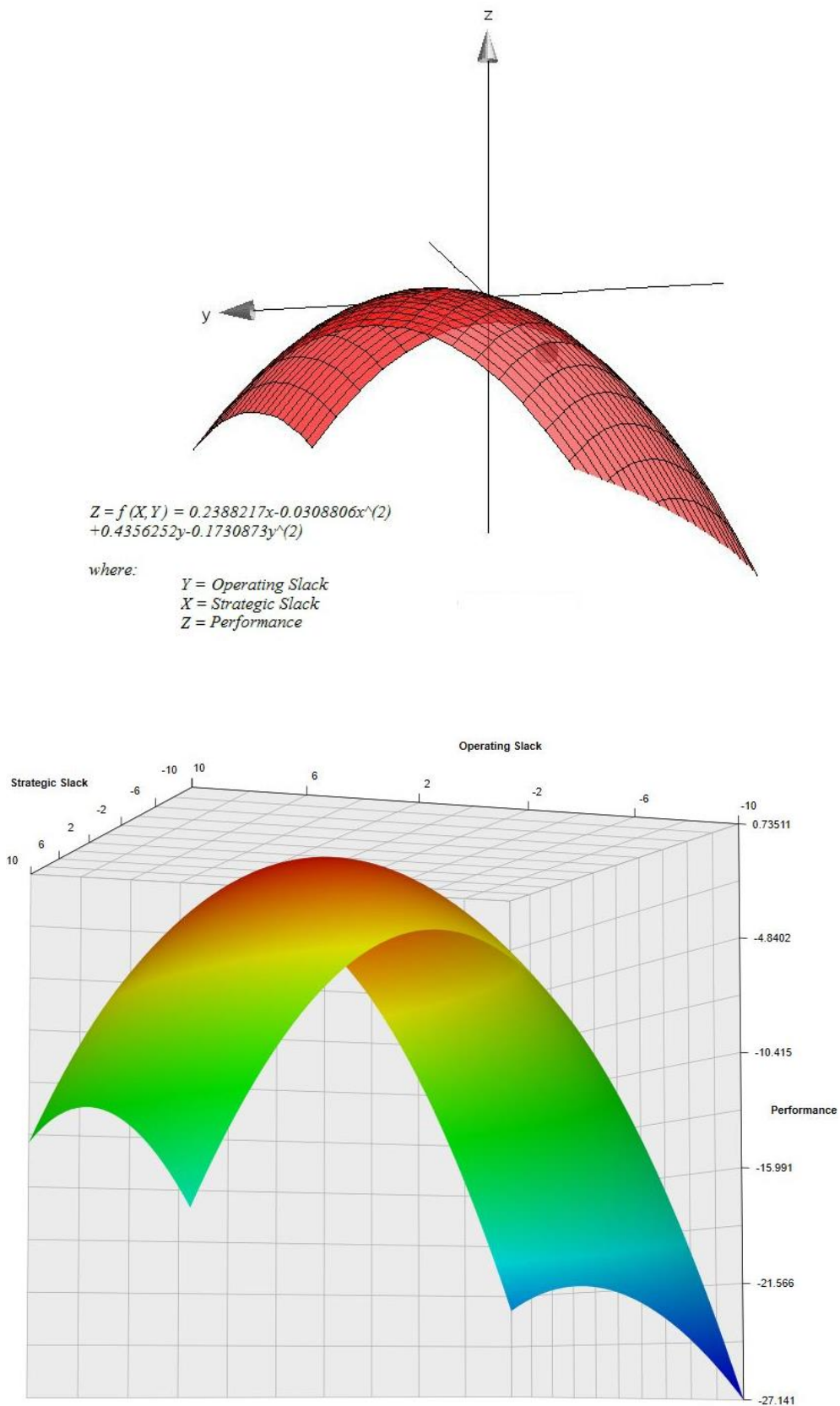


Figure 5-8 - Nonlinear adaptational slack forms - firm performance relationship

To add to the robustness of the findings, the 3-D and 2-D graphs were improved to portray the nonlinear slack-performance link measures as shown in Figs. 5.8, 5.9 and 5.10. Fig. 5.8 illustrates a '*surface plot*' graph created from the 3-D analysis. It is clear that the joint influence of the adaptational slack resources on performance can be best rendered as the 3D simulated surface displayed.

The 3D curve show the difficulty of the nonlinear relationship and the moderating influence of excess resources is generally supportive of the hypotheses. It was relied on to explain relationship strategic-operating slack and firm performance (see figure 5.8). For the below the average level of both adaptational slack forms, strategic slack – performance relationship is positive but level of operating slack gradually goes up and gradually levels off. The relationship between performance and operating slack is not significant in term of average level of strategic slack. On the other hand, the same relationship for higher level of strategic slack is negative.

Circumstances prior to and following the topmost point are highly liable to lessen firm performance. It demonstrates that a specific measure of slack can contribute to adaptability and flexibility, permitting the company to develop tactical options while at the same time curbing the effects of environmental unpredictability; however, over a certain crucial point before and after, slack starts to destroy firm performance. Figure 5.8 provides additional supporting evidence for hypotheses 5a and 6a. The findings reveal that high and low level of operating slack is negatively influenced firm performance.

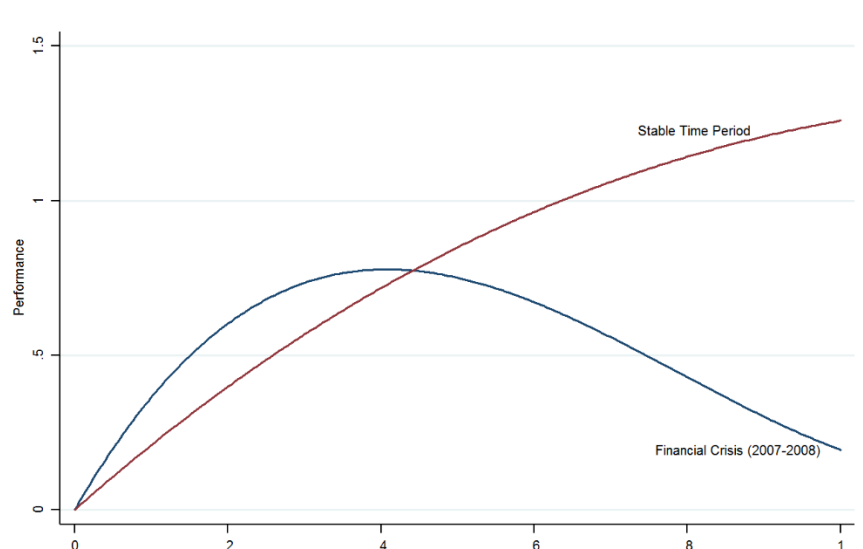


Figure 5-9 – Operating slack and performance relationship between crisis and stable time-period

In hypothesis 5a, it was hypothesized that the interaction of operating slack and environmental jolt is negatively associated. The principle effects interaction shows that the result of environmental jolt on performance-operating slack relationship is significant (see model 10). As shown in Fig.5.9, the relationship between operating slacks-performance alters at a more accelerated tempo during responsive phase than when conditions are constant in readjustment phases.

This difference weakens when the degree of environmental jolt increases due to concave shape of the environmental jolt. As mentioned above, the interaction of environmental jolt-operating slack is also significantly and negatively associated with performance in Model 10 ( $\beta = -0.0797$ ;  $p < 0.001$ ). This finding also supports hypothesis 5a. Similarly, it was assumed that the interaction between strategic slack and financial crisis is negatively associated with firm performance. The moderating influences of environmental jolt on the interaction between strategic slack and performance were evidenced by Model 10.



Model 10 also supports findings that suggest a significant and negative the interaction between strategic slack and environmental jolt. ( $\beta = -0.0243$ ;  $p < 0.001$ ). As illustrated in Fig.5.10, both financial crisis and stable environment's coefficients are affirmative and growing with 'strategic slack' on performance, while increase of before and after jolt are straighter when comparing to environmental jolt.

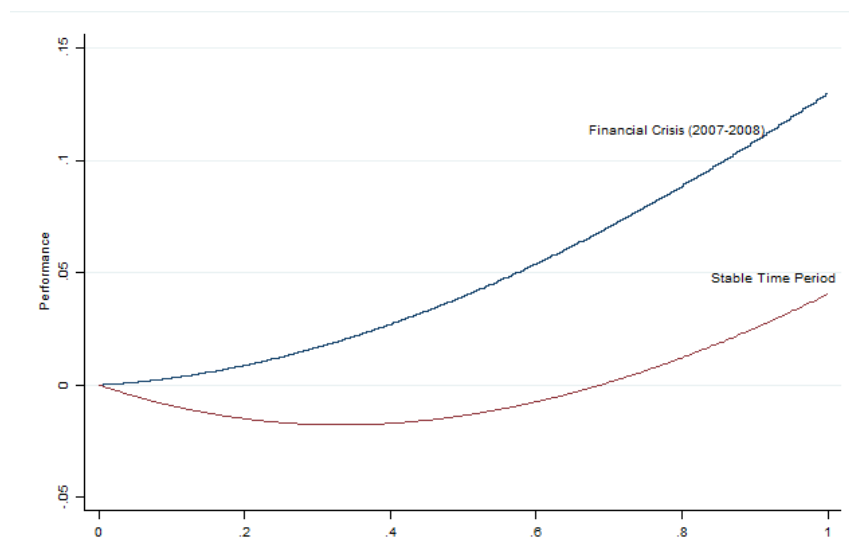


Figure 5-10 - Strategic slack and performance relationship between crisis and stable time-period

The results point out a negative and significant relationship for the two-way interactions of environmental jolt and excess resources. The empirical results were presented for environmental munificence and dynamism in Table 5.16b. The findings in Model 12 shows a complementary two-way and three-way interaction effects between munificence, dynamism, and operating slack.

However, operating slack and financial crisis have a negative interactive influence on Tobin's q ratio ( $\beta = -0.5974$ ;  $p < 0.001$ ). This suggests crisis interaction effects between operating slack and performance; that is, the positive impact of operating slack on firms' daily operations is weakened when financial crisis dummy is high. Moreover, financial crisis dummy and strategic slack have positive but non-significant interaction effects on performance ( $\beta = 0.0015$ ;  $p > 0.05$ ).

Overall, results show that financial crisis has significant effects on firms' current routines and decreasing profit growth and performance. The two-way interaction findings mostly support the theoretical notion argued in the conceptual model that financial crisis congruence between different form and level of slack resources may be a source of flexibility that create strategic options for future.

Regarding the moderating effects of environmental dynamism, the two-way interaction findings reported in Model 12 in Table 5.16b show that all two-way interactions of operating and strategic slack variables are significant. This provides clear evidence that environmental velocity is a significant environmental condition influencing the slack-performance relationship.

First, regarding "*dynamism \* strategic slack*", it was found that in more dynamic environment, the positive complementary effects between strategic slack and dynamism become stronger for Tobin's q ratio ( $(\beta = 0.8398; p < 0.01)$  and  $(\beta = -0.2080; p < 0.01)$  for "*dynamism \* strategic slack (square)*") (see figure 5.7a).

Second, it is also found that the interaction effects between dynamism and operating slack have a negative implication on performance ( $(\beta = -2.6014; p < 0.01)$  and  $(\beta = 1.3731; p < 0.01)$  for *dynamism \* operating slack (square)*) (see figure 5.8c). However, findings show that the interaction between environmental munificence and both operating and strategic slack is positively associated with performance.

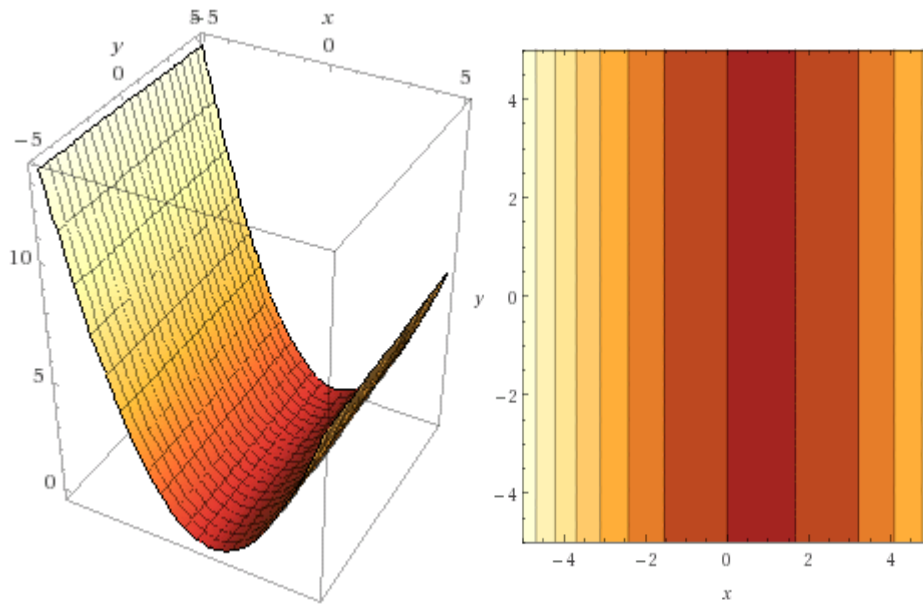
The slopes for munificence \* strategic slack is  $(\beta = 0.0315; p < 0.01)$  and munificence \* operating slack is  $(\beta = 0.1073; p < 0.01)$ , respectively (see figure 5.7b). However, interaction effects of square terms of both slack variables and munificence are negative and they are  $(\beta = -0.0096; p < 0.01)$  for munificence \* strategic slack (square) and  $(\beta = -0.0973; p < 0.01)$  for munificence \* operating slack (square), respectively (see figure 5.7d).

On the other hand, Table 5.16b also reports findings of the three-way interactions of environment variables and operating slack variable. The two-way interaction of munificence and dynamism affects firm performance significantly and positively ( $\beta = 0.0109$ ;  $p < 0.01$ ).

However, earlier studies argued that performance would be higher when a firm with alignment strategy and munificence environment while it would be lower when using alignment-oriented strategy in an uncertain or heterogeneous dynamic environment. Table 5.16b indicates three-way interaction and significant relationship between operating slack, dynamic and munificence environment.

The interaction of operating slack and dynamic and munificence environment is associated significantly and negatively in Model 13 ( $\beta = -0.6739$ ;  $p < 0.001$ ). However, configuration of square of operating slack and dynamism and munificence environments are positively associated with firm performance ( $\beta = 0.4036$ ;  $p < 0.001$ ).

The outcomes so far confirm the H7a that argues that munificence is positively associated with slack and performance. However, the findings partially support the H8a that suggests dynamism is positively associated with slack and performance. H8a is supported only strategic slack resources that improves firm performance in relatively highly dynamic environment.



$Z = \text{performance}$ ;  $y = \text{munificence} * \text{dynamism}$ ;  $x = \text{operating slack}$

Figure 5-11 - 3D Plot and counterplot for dynamism vs. munificence vs.slack vs performance

To explain better the interaction effect between slack, environmental munificence and dynamism and performance, the prominent findings were plotted obtained from model 13 of table 5.16b in a three-dimensional (3D) graph (see Figure 5.11). The 3D plot and counterplot graphs successfully describes that firm with high (or match with) degree of dynamism and munificence environment will have higher performance and can considerably boost their performance by enhancing their operating slack simultaneously.

However, firms with high operating slack and in only high munificence environment will have lower firm performance. This result is also confirmed by agency theory claim that higher-level slack resources lead to misuse or inefficiency on firm performance. However, the inclusion of these two-way interactions and quadric terms for strategic and operating slacks shows the potential detrimental multicollinearity among the estimation measures.

Following the Bradley et al. (2011b), the measures were mean-centred (data transformation) to reduce the bias because of the high correlations between higher order terms and the interactions and the main effect measures <sup>142</sup>.

The signs of the slope and the significance of two-way interaction terms were consonant with elucidated the findings of multiple regression analysis (FGLS) with a significant increment in the variance specified. 3D visualization also supports the findings that different environmental conditions affect firm performance differently by interacting different form of slack resources.

In general, the results upheld the core contention that several slack variables are positively associated with performance. The effect of these slack variables was more evident when excess resources were additionally grouped into operating and strategic resources. This impact also shows strong supports for H5a, H6a, H7a, and H8a in general.

In addition, this research indicates that the influence of excess resources is hardly linear. Alternatively, such influence shows a nonlinear slack-performance relationship. Most importantly, these outcomes were acquired from a panel dataset, which improved the reliability and validity significantly.

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<sup>142</sup> (VIF) was applied for models. The findings show that multicollinearity was not observed for all measures in each estimation (which is below a recommended maximum of 10) (Kutner et al., 2005).

#### 5.4. Financial Distress and Higher and Lower Performance Firms

The purpose of this section is to understand the existing differences between high performer and low performer firms based on ‘performance distresses’ throughout the given periods. The dichromatic groups were obtained by dividing firms into sub-samples based on their z-scores position. Initially, by using median values of z-score of firms, two sub samples of firms were generated as (1) high performing firms; and (2) low performing firms<sup>143</sup> by considering both classification simultaneously.

The mean values of the slack variables of interest in each sub-sample was provided and compared before, during and after financial crisis. To accomplish this, a measure classifying each firms’ z-score were used to investigate its impact on the performance differences attributable to firm adaptation behaviours. Given the nature of this goal, t-test is a better statistical method than other similar techniques like anova test to find out whether the difference of dichromatic group variable is statistically significant for each of slack variable.

Table 5-17 - Descriptive statistics of the high and low performer firms

	R&D	Working Cap.	Dividend	Inventory	SGA Exp.	MTBV	Cash	Employee	Asset Turnover	Leverage
<i>High Performer</i>	1.3542	0.3154	0.9183	0.2697	3.001	1.1164	0.2319	11.814	1.002	3.2995
<i>Low Performer</i>	1.0157	0.1445	0.8237	0.2646	2.9214	0.8622	0.099	12.0021	0.9878	3.2493
<i>Total</i>	1.2255	0.2486	0.8844	0.2677	2.9705	1.0174	0.1801	11.8854	0.9966	3.2803

*This table presents the descriptive statistics of high and low performer firms.*

In table 5.17, findings of descriptive statistic show that higher performance firms have more strategic and operating slack comparing with lower performance firms, with one exception. Low performer firms have more level of sales per employee ration than higher firms.

Moving away from full sample, as subgroups, mean level of each high performing and low performing firms were also compared. Table 5.18 shows overall t-test results that were used to examine whether resource variation in overall performance is attributable to resource characteristics, and interaction effect for each group.

Comparing the mean value of strategic and operating slack variables also leads to an interesting inference. There are several significant observations that are of particular interest. In specific, findings show that inventory turnover, asset turnover and leverage ratios are not significant before and during the financial crisis. The rest of slack variables were differed in between pre-crisis and crisis periods.

Similarly, in between crisis and post-crisis periods, only inventory and leverage ratios did not show any statistically significant change. If ignoring inventory, all adaptational slack variables are positive and significantly differ in between crisis and post-crisis periods.

Post-crisis asset turnover ratio was differed from pre-crisis asset for high performing firms (see Table 5.18). Therefore, these results partially supports hypothesis 10a. Findings also suggest that differences between low performer and high performer firms before, during and after financial crisis are significant. H10a predicts that high performer firms will be more successful at a higher level than low performer firms. According to Table 5.17 and Table 5.18, the findings support both hypotheses.

Table 5-18 - T-test for different time-periods

	High Performer Firms		Low Performer Firms	
	Pre-crisis vs Crisis	Crisis vs Post-Crisis	Pre-crisis vs Crisis	Crisis vs Post-Crisis
R&D Slack	0.133** -0.49	0.194*** (-1.42)	0.258*** -4.13	0.275*** -4.67
Working Cap. Slack	0.123** (-1.06)	0.114** -0.34	0.128** -1.48	-0.015 (-1.03)
Dividend Slack	0.127** (-0.74)	0.156*** -1.12	0.112** (-0.33)	0.123** -2.61
Inventory T. Slack	0.051 -0.06	-0.014 (-1.08)	0.112** (-1.03)	-0.047 (-0.72)
Marketing Slack	0.155*** (-1.28)	0.174*** (-1.82)	-0.115** (-2.86)	-0.104** (-2.73)
Market Value Slack	0.079*** -3.34	0.137*** -5.24	-0.053* (-2.32)	0.113*** -0.54
Cash Slack	0.121** -0.87	0.114** (-0.35)	0.104** -0.19	0.118** (-1.73)
Leverage Slack	0.102* -0.04	0.144** -0.94	0.106* -0.13	-0.056 (-0.14)
Asset Utiliz. Slack	0.033 -1.49	0.116** -0.52	-0.037 (-1.72)	0.132** -1.17
Employee Slack	0.007 -0.1	0.009 (-1.03)	0.034 -0.47	0.115** -1.3
N	1804	1118	2049	1360

For the low performer firms, all strategic slack variables have a significant difference in between pre-crisis and crisis period. However, only MTBV, cash and sales per employee ratios as operating slack have shown a significant change in the between same periods.

On the other hand, working capital turnover, inventory turnover and sales per employee ratios were not changed significantly in post-crisis period when comparing with during crisis. R&D intensity, dividend pay-out and SG&A expenses ratios as strategic slack variables and MTBV, cash, asset turnover and leverage ratios as operating slack variables were statistically significant changed in post crisis period in comparison with crisis period.



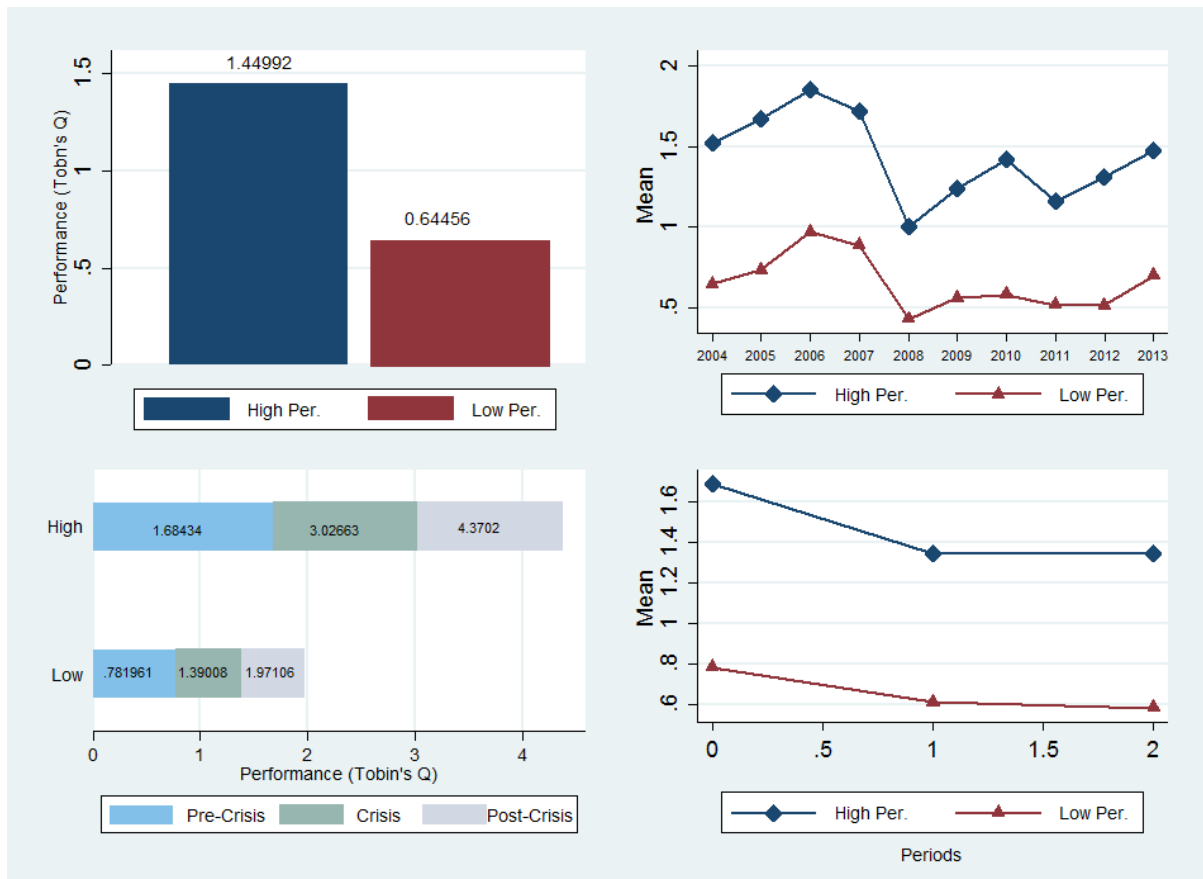


Figure 5-12 - Performance changes for High and Low performer firms

However, figure 5.12 demonstrates a combination of illustration graphs of performance change for higher and lower performance firms in the sense of period-centric and year-centric. It also evidenced that higher performing firms have more Tobin's q ratio than low performing firms for each period and over-time. However, it shows that higher performing firms have more fluctuated than low performing overt-time (see figure 5.12).

Table 5.19 presents FGLS estimation results. As the baseline, Model 14 and 15 include all time periods for both high and low performing firms. Model 16 to 19 contain before, during and after environmental jolt, respectively. Model 20 and 21 show curvilinear relationship between independent variables and performance variable.

The models are built incrementally, from the whole period to the sub-periods of independent variables and moderating variables period by period. The changes in model  $\chi^2$  are significant ( $p < .05$ ), marking the improvement in overall model fit by the change of respective periods in each model.

Table 5-19 - FGLS regression for high - low performing firms across the periods

	High Performers	Low Performers	High Performers			Low Performers		
	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21
	For whole period		pre-crisis	crisis	post-crisis	pre-crisis	crisis	post-crisis
R&D Slack	0.168*** -7.39	0.015 -0.59	0.375*** -7.76	0.088** -3.13	0.132*** -4.22	-0.100* (-2.00)	0.042 -1.26	0.090* -2.33
Working Cap. Slack	0.205* -2.15	-0.22 (-1.45)	-0.016 (-0.08)	0.534*** -4.15	0.227 -1.41	0.133 -0.67	0.164 -1.7	- (-3.34)
Dividend Slack	0.098*** -3.7	-0.072* (-2.45)	0.256*** -4.94	0.167*** -4.79	-0.04 (-0.97)	-0.073 (-1.74)	0.039* -2.12	- (-3.37)
Inventory T. Slack	0.102 -0.96	0.538*** -4.2	0.067 -0.25	0.082 -0.43	0.365 -1.79	0.146*** -5.17	0.449*** -6.62	0.264 -1.12
Marketing Slack	0.175*** -5.76	0.005 -0.14	0.232*** -3.51	0.110* -2.4	0.126*** -3.39	-0.045 (-0.74)	-0.044 (-1.14)	0.194*** -3.68
Market Value Slack	0.512*** -17.99	0.555*** -11.1	0.179*** -13.5	0.191*** -20.13	0.522*** -11.18	0.534*** -8.07	0.561*** -11.64	0.512*** -7.07
Cash Slack	0.105 -0.8	0.302* -2.27	0.210*** -3.61	-0.136 (-0.57)	-0.141 (-0.52)	0.494 -1.26	0.234 -1.15	0.488*** -5.54
Leverage Slack	0.157*** -5.73	0.060* -2.07	0.171** -3.09	0.169*** -3.6	0.188*** -5.35	-0.059 (-1.14)	0.162*** -6.57	0.038 -0.76
Asset Util. Slack	-0.013 (-0.37)	0.146*** -4.59	-0.074 (-1.24)	0.001 -0.01	-0.114** (-2.68)	0.277*** -6.37	0.039 -1.26	0.203*** -4.33
Employee Slack	0.01 -1.04	0.01 -1.15	0.03 -1.49	0.019 -1.58	0.035** -2.63	-0.051*** (-3.33)	0.01 -0.94	0.031** -2.75
Firm Age	0.001 (-0.14)	-0.002 (-1.46)	0.007* -2.45	0.002 -0.96	-0.003 (-1.50)	0.001 -0.72	-0.004** (-2.67)	0.001 -0.68
Firm Size	-0.077*** (-6.79)	0.005 -0.42	-0.187*** (-7.45)	-0.033* (-2.00)	-0.041** (-2.99)	0.045* -1.97	-0.024 (-1.91)	-0.008 (-0.38)
Constant	-2.028*** (-5.32)	-0.714 (-1.94)	-3.169*** (-4.81)	-3.962*** (-6.42)	- 2.101*** (-4.20)	0.412 -0.65	-2.129*** (-6.34)	-1.268 (-1.95)
N	1074	532	284	298	492	121	155	256

Performance variable = Tobin's Q

From the model 14, results indicate the effect is not significant for all slack variables. For example, inventory, cash, asset turnover and leverage have not any direct impact on firm performance. However, almost all strategic slack variables are interacted significantly and positively with performance.

The degree of relationship of R&D intensity with performance is ( $\beta = 0.168$ ;  $p < .001$ ). Similarly, working capital turnover has positive impact on performance ( $\beta = 0.205$ ;  $p < .05$ ) and dividend pay-out ratio has ( $\beta = 0.098$ ;  $p < .001$ ) significant and positive relationship. SG&A influences performance positively ( $\beta = 0.175$ ;  $p < .001$ ), supporting hypothesis 1a. However, most of operating slack variables are not significant in general. Only MTBV ratio ( $\beta = 0.512$ ;  $p < .05$ ) and sales per employee ratio ( $\beta = 0.157$ ;  $p < .05$ ) are associated with firm performance positively. The rest of operating slack variables are not significant in general.

Model 15 indicates that the influence of most of slack is associated with performance significantly and positively. In term of strategic slacks, while dividend pay-out ratio ( $\beta = -0.072$ ;  $p < .001$ ) negatively associated with performance, marketing expenses ratio ( $\beta = 0.538$ ;  $p < .001$ ) is positively associated.

On the other hand, almost all operating slack variables have a positive relationship with performance, except leverage. MTBV ratio ( $\beta = 0.555$ ;  $p < .001$ ), cash ratio ( $\beta = 0.302$ ;  $p < .05$ ), sales per employee ratio ( $\beta = 0.06$ ;  $p < .05$ ), and asset per employee ratio ( $\beta = 0.146$ ;  $p < .001$ ) are positively associated with firm performance.

For higher performance firms, model 16, 17 and 18 demonstrate sub-period relationship of slack variables and performance. For pre-crisis, Model 16 reports that majority of strategy slack variables have significant relationship with performance. For instance, R&D intensity ( $\beta = 0.375$ ;  $p < .001$ ), dividend pay-out ( $\beta = 0.256$ ;  $p < .001$ ), and SG&A expenses ( $\beta = 0.232$ ;  $p < .001$ ) are associated with performance positively in pre-crisis period.

Similarly, from operating slacks, MTBV ratio ( $\beta = 0.179$ ;  $p < .001$ ), cash ratio ( $\beta = 0.210$ ;  $p < .001$ ), and sales per employee ratio ( $\beta = 0.171$ ;  $p < .05$ ) have positive relationship with firm performance for high performing firms in pre-crisis period. Model 8 shows crisis period relationship in between slack variables and Tobin's Q.

Despite the high performing firms used operating slack resources, they seem to focus mainly on using strategic slack during the crisis period rather than using operating slack. For example, except inventory turnover ratio, all strategic slack variables are interacted significantly and positively with performance.

The coefficient of R&D intensity ( $\beta = 0.088$ ;  $p < .001$ ), working capital ratio ( $\beta = 0.534$ ;  $p < .001$ ), dividend ratio ( $\beta = 0.167$ ;  $p < .001$ ), and marketing expenses ratio ( $\beta = 0.110$ ;  $p < .05$ ) are significant and positive. In terms of effects of operating slacks, only MTBV ratio ( $\beta = 0.110$ ;  $p < .05$ ) and sales per employee ratio ( $\beta = 0.191$ ;  $p < .001$ ) are associated with Tobin's q positively during the crisis for high performing firms. Firm size is also affecting firm performance by 17% in the same period. However, model 9 reports after crisis period relationship.

In this period, higher performing firms appear to having strong relationship with operating slack resources. For example, R&D intensity ( $\beta = 0.132$ ;  $p < .001$ ) and SG&A expense ratio seem to only strategic slack variables that interact and have a directly influence on performance after environmental jolt. On the contrary, higher performance firms have a more comprehensive relationship with performance. As can be seen from model 9, except asset turnover ratio, all operating slack variables have statistically significant relationship with Tobin's q. While MTBV ratio ( $\beta = 0.188$ ;  $p < .001$ ) and sales per employee ( $\beta = 0.035$ ;  $p < .01$ ) are associated with positively, cash ratio ( $\beta = -0.114$ ;  $p < .01$ ) and leverage ( $\beta = -0.041$ ;  $p < .01$ ) are associated with performance negatively, respectively.

For the low performing firms, model 19 reports the pre-crisis relationship of slacks and firm performance. In pre-crisis period, low performer firms appear to stay more focused on generating slack resources comparing with high performing firms in pre-crisis period. Unlike high performing firms in pre-crisis period, low performing firms have a negative the coefficient of R&D intensity ( $\beta = -0.100$ ;  $p < .05$ ) same period.

However, low performers have a positive association with performance in term of inventory turnover ( $\beta = 0.146$ ;  $p < .001$ ). In the same period, while MTBV ratio ( $\beta = 0.534$ ;  $p < .001$ ) and asset turnover ratio ( $\beta = 0.277$ ;  $p < .001$ ) is associated positively with Tobin's q ratio, firm leverage ( $\beta = -0.051$ ;  $p < .001$ ) has a negative relationship. As a control variable, firm size is also positively affect firm performance ( $\beta = 0.045$ ;  $p < .05$ ).

Furthermore, model 20 demonstrates during crisis relationship. Dividend pay-out ratio ( $\beta = 0.039$ ;  $p < .05$ ) is affirmative and significant. Low performing firms are more likely to aim at attracting investors by paying dividend during the crisis. The coefficient of inventory turnover ratio ( $\beta = 0.449$ ;  $p < .001$ ) is also positive and significant in the same period. On the other hand, from the point of operating slacks, only MTBV ratio ( $\beta = 0.561$ ;  $p < .001$ ) and sales per employee ( $\beta = 0.162$ ;  $p < .001$ ) are major and positively associated with Tobin's q. Firm age ( $\beta = -0.004$ ;  $p < .01$ ) has also a negative impact on firm performance for low performing firms.

In model 20, almost all slack variables are statistically significant. Interestingly, low performing firms seem to stay less focus on strategical slack comparing with previous periods. For example, although R&D intensity ( $\beta = 0.90$ ;  $p < .05$ ) and marketing slack ( $\beta = 0.264$ ;  $p < .001$ ) ratios affects firm performance positively, working capital ( $\beta = -459$ ;  $p < .001$ ) and dividend pay-out ( $\beta = -0.152$ ;  $p < .001$ ) ratios affect firm performance negatively after financial crisis.

On the other hand, almost all operating slack variables are affirmatively interacted on firm performance. For instance, all MTBV ratio ( $\beta = 0.512$ ;  $p < .001$ ), cash ratio ( $\beta = 0.488$ ;  $p < .001$ ), asset turnover ratio ( $\beta = 0.203$ ;  $p < .001$ ), and debt to equity ratio ( $\beta = 0.031$ ;  $p < .01$ ) have a positive coefficient with performance.

Table 5-20 – Firm Performance and Z-Score Relationship

	Model22		Model23		Model24	
	<u>Z Score</u>		<u>Z Score</u>		<u>Z Score</u>	
Performance (Tobin's Q)			0.950***	-0.286	0.881***	-19.67
Perform. for Post-Crisis	1.091***	-26.21				
Crisis			-0.192***	-7.19	-0.197***	-4.97
Post-Crisis * Performance					0.073	-1.52
Firm Size	-0.183***	(-4.32)	-0.299***	(-15.80)	-0.290***	(-14.91)
Firm Age	0.028***	-5.02	0.004	-1.88	0.004	-1.84
Constant	2.271***	-4.00	2.883***	-13.18	2.889***	-12.74
<i>df</i>	31		33		34	
<i>chi2</i>	1480.02		1970.7		1607.02	
<i>N</i>	900		2161		2161	

Note: Z-score refers to Altman's Z-score. Performance refers to Tobin's Q ratio. Crisis refers to financial crisis dummy.

Table 5.20 presents the results of regressions of risk-performance relationship in the case of financial crisis. Model 22 presents the result for post-crisis performance and z-score relationship. The model 23 and 24 analyse the performance and crisis performance interaction. In Model 22<sup>144</sup>, with all control variables included, the coefficient on post-crisis firm performance is interacted with significantly and positively ( $\beta = 1.091$ ;  $p < 0.001$ ).

<sup>144</sup> The correlation between Tobin's q and z-score is 0.2843

The findings evidences that higher z-score firms have better ex-post performance than lower firms. To precisely capture how the effects of financial crisis vary, crisis dummy was included to model 2<sup>145</sup>. The performance variable has a significant impact on z-score ( $\beta = 0.950$ ;  $p < 0.001$ ). Z-score and performance interaction is positive in model 2<sup>146</sup>. This result also indicates that an increase in firm's risks leads to decrease on Tobin's q ratio ( $\beta = -0.192$ ;  $p < 0.001$ ).

However, environmental jolt is associated with firm's financial strength negatively. As expected, the findings evidenced that financial crisis increases firm's risks. The variable firm size is significantly and negatively related to the dependent variable ( $\beta = -0.299$ ;  $p < 0.001$ ), the constant beta of firm age related to the z-score is not statistically significant but positive ( $\beta = 0.004$ ;  $p > 0.05$ ). In Model 24, the constant *beta* of interaction of post-crisis and firm performance, which captures the impact of interaction variable has no effect on the risk, is insignificant regardless of methodology employed ( $\beta = 0.073$ ;  $p > 0.05$ ).

The trend in performance is positive and gradually increases ( $\beta = 0.881$ ;  $p < 0.001$ ). The financial crisis dummy has a significant effect on dependent variable  $\beta = -0.197$ ;  $p < 0.001$ ) and it is associated with performance negatively in Model 24.

The overall findings show positive and significant interaction between performance and financially strength firms. The findings are supporting H9b that argues that there is a positive association between post-crisis performance and z-score and interaction of post-crisis dummy and performance and z-score. The findings of Table 5.20 makes additional contribution to support H2a and H5a.

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<sup>145</sup> The post-crisis dummy interaction was removed due to collinearity issue.

## 5.5. Risk Taking Behaviours

### 5.5.1. Correlation and Factor Results for Risk-Taking

Given the polymorphous structure of firm risk, seven risk related slack measures were employed (listed in Table 5.21). EFA was applied to group the seven measurements. The factor analysis consisted of three steps. An exploratory analysis of the pre-crisis period was first conducted and then employed the same techniques on the during and after environmental jolt. Next, the congruence between the factor structures for the three periods were examined. Table 5.22 reports the rotated factor scores for the sets of risk variables.

Measures of the orthogonal factor model on the pre-crisis period data indicated three eigenvalues higher than one. The top of Table 5.22 shows the principle component factor solution with varimax rotation for pre-crisis period. Middle and bottom of Table 5.22 reports during crisis and post-crisis periods, respectively.

Factors with eigenvalues higher than one were retained for rotation, and the described variance explained is for the rotated factor pattern. Following (Lim and Mccann, 2013, Miller and Bromiley, 1990, Alessandri and Khan, 2006, Tsai and Luan, 2016), the factor structure was also estimated using a maximum likelihood estimation. Those findings with those employing an oblique rotation were analogous to the pattern of factor scores demonstrated here.

The factor scores for the seven variables and KMO values are all higher than 0.5. KMO values are 0.6345 for pre-crisis, 0.6222 for during crisis, and 0.6608 for post-crisis periods, respectively (Kaiser-Meyer-Olkin measure of sampling adequacy).



Table 5-21 – Pearson’s correlations among risk variables

		1	2	3	4	5	6	7
1	R&D	1						
2	Capital Exp.	0.595	1					
3	T. Long T. Debt	0.572	0.517	1				
4	Sd. ROA	0.089	0.025	0.006	1			
5	Sd. ROE	0.072	0.054	0.113	0.451	1		
6	Current Ratio	-0.089	-0.111	-0.123	0.101	-0.008	1	
7	Interest Coverage	0.015	0.011	0.006	-0.065	-0.010	0.447	1

Table 5-22 - Factor analyses for risk in different time-periods

<i>Pre-Crisis</i>	Variance	Difference	Proportion	Cumulative
Factor1	2.46642	0.74002	0.3523	0.3523
Factor2	1.7264	0.71332	0.2466	0.599
Factor3	1.01308	.	0.1447	0.7437
<i>Variable</i>	<i>Factor1: Strategic Risk</i>	<i>Factor2: Return Risk</i>	<i>Factor3: Operating Risk</i>	<i>Uniqueness</i>
R&D	<b>0.856</b>	0.1114	0.1093	0.2428
Capital Exp.	<b>0.9215</b>	-0.021	-0.0008	0.1504
T. Long Debt	<b>0.912</b>	0.0016	-0.0544	0.1654
Sd. ROA	0.0537	<b>0.919</b>	-0.028	0.1518
Sd. ROE	0.0093	<b>0.8873</b>	-0.0138	0.2125
Current Ratio	-0.2214	0.2836	<b>0.869</b>	0.7983
Interest Coverage	0.0283	-0.0363	<b>0.9617</b>	0.073
<i>During Crisis</i>	Variance	Difference	Proportion	Cumulative
Factor1	2.24103	0.73166	0.3201	0.3201
Factor2	1.50937	0.22343	0.2156	0.5358
Factor3	1.28594	.	0.1837	0.7195
<i>Variable</i>	<i>Factor1: Strategic Risk</i>	<i>Factor2: Return Risk</i>	<i>Factor3: Operating Risk</i>	<i>Uniqueness</i>
R&D	<b>0.7905</b>	0.0647	0.0343	0.3698
Capital Exp.	<b>0.9053</b>	-0.0218	-0.0458	0.1779
T. Long Debt	<b>0.8731</b>	0.077	-0.1012	0.2216
Sd. ROA	-0.0073	<b>0.8685</b>	0.0549	0.2427
Sd. ROE	0.0884	<b>0.8569</b>	-0.0468	0.2556
Current Ratio	-0.1602	0.0817	<b>0.7761</b>	0.3653
Interest Coverage	0.0304	-0.059	<b>0.8154</b>	0.3307

<i>Post-Crisis</i>	Variance	Difference	Proportion	Cumulative
Factor1	2.33545	0.96401	0.3336	0.3336
Factor2	1.37144	0.11657	0.1959	0.5296
Factor3	1.25487	.	0.1793	0.7088

<i>Variable</i>	<i>Factor1: Strategic Risk</i>	<i>Factor2: Return Risk</i>	<i>Factor3: Operating Risk</i>	<i>Uniqueness</i>
R&D	<b>0.8229</b>	0.0486	0.0413	0.3188
Capital Exp.	<b>0.898</b>	-0.0104	-0.0355	0.1923
T. Long Debt	<b>0.9051</b>	0.0611	-0.0976	0.1675
Sd. ROA	-0.0416	<b>0.8242</b>	0.1441	0.2983
Sd. ROE	0.1246	<b>0.8235</b>	-0.0943	0.2975
Current Ratio	-0.1234	0.0855	<b>0.7587</b>	0.4018
Interest Coverage	0.0139	-0.0236	<b>0.7982</b>	0.3622

The first factor, which loads positively on the R&D intensity, long term debt and capital intensity (Miller and Bromiley, 1990), captures some key firm risk influencing firm adaptation profiles and was labelled as strategic risk, which also affect the firm's adaptability, growth, long-term survival, and competitiveness.

These three measures, consistent with Lim and Mccann (2013), loaded on one factor with loading of (0.856, 0.9215, and 0.912) for pre-crisis, (0.7905, 0.9053, and 0.8731) for during crisis, and (0.8229, 0.898, and 0.9051) for post-crisis periods, respectively. The findings show that the same factor groups can be used for whole period. Therefore, by following the Lim and Mccann (2013), a strategic risk index variable was created for whole period.

The EFA for the risk relevant proxy measures indicated that the factor scores obtained more than half of the variance in a single factor with an eigenvalue of higher than one and factor loadings were higher than 0.7905, proposing that risk-related factors clustered superbly together. All three risk-related factor groups were scaled and then normalized and summed respectively in order to form the composite *strategic risk-taking intensity index, with consistent with* Lim and Mccann (2013).

The second factor, consisting of current ratio and firm interest coverage, which termed as operating risk. The operating risk measure captures operating and current market risk. The factor loadings were (0.869 and 0.9617) for pre-crisis, (0.7761 and 0.8154) for during crisis and (0.7587 and 0.7982) for post-crisis periods, respectively. Current ratio and level of interest coverage represent the movements in a firm's short-term liquidity and risk value. Therefore, they are important indicators from the point of showing current market risks. A similar procedure was applied to second risk factor to generate a composite *operating risk-taking*.

The third risk measure, firm return-risk, captures profitability variability (Miller and Bromiley, 1990). The standard deviations (sd) of ROA and ROE were employed (Miller and Bromiley, 1990). The standard deviations of ROE and ROA are the accounting-based measures have large negative for ROA and positive for ROE loadings on the first factor. The standard deviation of profitability ratios was calculated using 5 years mean average of ROA and ROE ( $t=0$  through  $t-4$ ). The factor scores were (0.919 and 0.8873) for pre-crisis, (0.8685 and 0.8569) for during crisis, and 0.8242 and 0.8235 for post-crisis periods for ROA and ROE, respectively.

The middle of Table 5.22 reports the results from the principle components of factor loadings with varimax rotation for the during the crisis period. As with the pre-crisis period, both maximum likelihood factor analysis was used and an oblique rotation factor rotation was also conducted in order to check the consistency of the factor scores pattern across alternative techniques.

Similarly, bottom of Table 5.22 shows the results from the principle components of factor loadings with varimax rotation for the post-crisis period. Similar procedures were applied for post-crisis factor loadings and varimax solution was reported in Table 5.22. The findings from various methods consistent with the varimax rotated principle components findings confirmed here.

The factor analysis was used with the seven measurement to create a single risk-oriented variable. Overall outcomes show that all rotated factor scores are greater than 0.5 with three eigenvalues of 1.662, 1.446, and 1.225, respectively. Then, these factor scores were used to measure the contribution of risk-taking behaviours on slack-performance relationship.

Table 5-23 - Post-crisis performance vs. Risk-taking behaviours

	Full Model		High Performer		Low Performer	
<i>Performance<sub>post-crisis</sub></i>	Model 25		Model 26		Model 27	
<i>Performance<sub>pre-crisis</sub></i>	0.022	-1.84	0.024	-1.71	-0.008	(-0.40)
Strategic Risk	0.045***	-7.45	0.038*	-2.22	2.264***	-5.59
Operating Risk	-0.11	(-1.30)	0.224*	-2.14	-0.426***	(-4.28)
Firm Size	0.021**	-3.21	0.009	-1.02	0.038***	-3.97
Firm Age	-0.001	(-1.88)	-0.001	(-0.91)	0.003*	-2.36
Constant	0.427*	-2.53	0.331*	-2.06	0.824***	-4.03
N			1206		779	
d f			33		33	
chi2			6937.814		1085.203	

*Performance variable = Tobin's Q*

Table 5.23 presents the results of performance and risk-taking behaviours. The estimation of the influence of risk-taking on performance were examined from the perspective of high and low performer firms. First, a cumulative set of measures were analysed, since multiple past studies were not differentiated by level of performance. Second, the model separately for high and low performing firms were estimated. Third, separate models for different industries were also estimate to test the robustness of results. Using cumulative data and feasible GLS procedures<sup>147</sup>, the results were obtained reported in Table 5.23.

<sup>147</sup> FGLS employed due to significance of the lagged variables indicates significant serial correlation.

Since substantive results of the Tobin's Q estimation equation agree, those findings were discussed together. Although operating risk has negative parameter estimates in model 25 here, coefficient is statistically insignificant ( $\beta = -0.11$ ;  $p < 0.001$ ). That insignificance does not lend strong support to expectations but is consistent with hypothetical debate suggesting a negative effect for operating risk.

Operating risk is associated with post-crisis performance positively in model 26 ( $\beta = 0.224$ ;  $p < 0.001$ ) and negatively in model 27 ( $\beta = -0.426$ ;  $p < 0.001$ ). Regarding model 26, operating slack variable supports hypothesis 10b for only higher performing firms. Nevertheless, regarding model 27, it supports hypothesis 10b for lower performing firms and however rejects 10b for higher performing firms.

However, strategic risk has significant and positive estimates in all models. The coefficients of strategic risk are ( $\beta = 0.045$ ;  $p < 0.001$ ) for model 24; ( $\beta = 0.038$ ;  $p < 0.001$ ) for model 25; ( $\beta = 2.264$ ;  $p < 0.001$ ) for model 26. On the other hand, pre-crisis performance in the entire model estimations are statistically insignificant, although strategic risk affects performance positively. The finding also supports H10a for both higher and lower performing firms.

Nevertheless, firm age is only significant and positively associated with performance in model 26. Surprisingly, firm size was interacted with firm performance positively in model 24 and model 25. These results support the position that by increasing long-term investments or decreasing revenue by investing to long term tools, risk somewhat increases firm performance for both types of performance firms.

The coefficient of lower performance firms is greater than higher performance firms do. This finding supports for the prospect theory argument that the low performer firms take riskier initiatives than high performer firms do. On the other hand, in terms of operating risk, the findings support threat-rigidity argument that the taking short-term risks decreases firm performance.

Table 5.24 shows the findings of the FGLS procedure of the effect of risk-taking capabilities on performance and the combined influence of the strategic slack and operating slack on the risk-performance relationship. In this modelling approach, several recent studies (Tsai and Luan, 2016) guided the current methodology to contain both the quadric and linear forms of excess resources.

The model also includes the two-way interactions of strategic slack and operating slack with risk-taking behaviours, respectively. Lastly, model also fully performs the three-way interaction of strategic slack, operating slack, and risk-taking behaviours on firm performance. The performance would boost with risk-taking at a faster rate for firms with greater slack, than firms with lower slack.

The moderating impact of '*strategic risk*' on the excess resources-performance link is not significant in the principle influences interaction from the model ( $\beta = -2.268$ ;  $p > 0.05$ ), but is negative and major for the operating risk-performance relationship ( $\beta = -0.164$ ;  $p < 0.001$ ). In addition, two-way interactions of operating risk ( $\beta = -1.830$ ;  $p < 0.001$ ) and operating risk square ( $\beta = -0.545$ ;  $p < 0.001$ ) with operating slack are significant.

Similarly, the interaction of strategic risk and operating risk is significant and positive ( $\beta = 1.799$ ;  $p < 0.001$ ). The coefficients of interactions of strategic risk ( $\beta = 1.70$ ;  $p < 0.001$ ) and strategic risk square ( $\beta = 0.198$ ;  $p < 0.001$ ) with operating slack are both positive and significant. Therefore, while the findings are rejecting hypotheses 10c predicts that the interaction effect of strategic slack with strategic risk and operating risk are associated significantly and positively with firm performance. On the contrary, regarding interaction of strategic and operating risk with operating slack, the results support both H10d.

Table 5-24 - Analysis for interaction relationship between slack and risk-taking behaviours

Tobin's Q	Model 28	
Firm Size	-0.031***	(-7.27)
Firm Age	-0.001	(-1.51)
Industry Concentration	0.286	-1.09
Prior Experience	0.001	-1.08
Strategic Risk	1.641***	(-7.55)
Operating Risk	-1.486***	(-5.28)
Strategic Slack	0.180**	-2.8
Operating Slack	-0.896***	(-14.86)
Strategic Slack Square	0.024**	-2.91
Operating Slack Square	0.637***	-29.67
Strategic Risk Square	-0.127***	(-8.68)
Operating Risk Square	1.347**	-3.26
Strategic Slack * Strategic Risk	-2.268	(-1.67)
Strategic Slack * Operating Risk	-0.164**	(-3.09)
Operating Slack * Strategic Risk	1.700***	-8.45
Operating Slack * Strategic Risk Sq.	0.198***	-9.07
Operating Slack * Operating Risk	1.830***	-12.03
Operating Slack * Operating Risk Sq.	-0.545***	(-8.29)
Strategic Risk * Operating Risk	1.799***	-8.03
Strategic Risk * Strategic S. * Operating S.	1.919	-1.6
Operating Risk * Strategic S. * Operating S.	-1.754***	(-9.01)
Constant	2.806***	-7.4
N	2050	
df	58	
chi2	1629.327	

*Performance variable = Tobin's Q*

However, the findings from Table 5.24 report a significant relationship but insignificant slope for the three-way interaction of *Strategic Risk \* Strategic Slack \* Operating Slack* ( $\beta = 1.919$ ;  $p < 0.001$ ). On the other hand, the slope for the three-way interaction of *Operating Risk \* Strategic Slack \* Operating Slack* is significantly and negatively associated with performance ( $\beta = -1.754$ ;  $p < 0.001$ ).

It is important to note that the addition of three-way and two-way interactions and quadric forms for risk-taking behaviours and slack variables lead to the possibility of multi-collinearity among variables<sup>148</sup>.

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<sup>148</sup> Following Bradley (2011), a variance inflation factor (VIF) also applied to variables and result showed that all variables in model were under the commonly recommended level of 5, indicating that there is no multi-collinearity. In addition, for the robustness purposes, both a fixed effects procedure with auto-correlation and heteroscedastic were estimated (Arellano and Bond, 1991). The findings of coefficients in the model were consistent with findings in FGLS model.



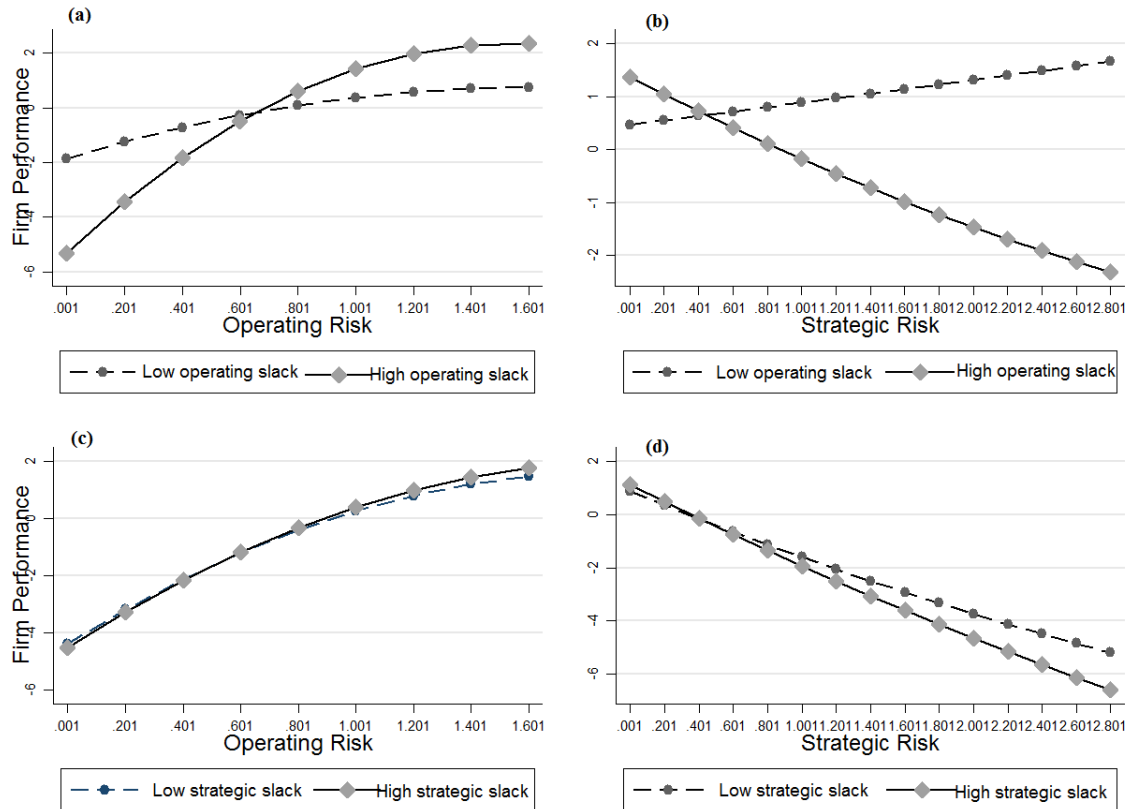


Figure 5-13 - Interactions between adaptation slack, risk-taking behaviours and performance

As shown in figure 5.13a, the link between risk-taking behaviours and performance varies quickly (steeper negative slope) in firms with limited strategic slack comparing with firms with greater level of strategic slack and operating slack.

The distinction decreases at greater levels of operating slack because of the concave construct of firms with higher level of operating slack. As shown in figure 5.13b, the firms with low operating slack coefficient is associated positively and increase gradually with strategic risk on firm performance, while firms with higher level of operating slack is negative and decreasing with strategic risk on performance. Figure 5.13d illustrates similar conditions with figure 5.13b. Comparing to figure 5.13b, truss span is very narrow for figure 5.13d.

On the other hand, figure 5.13a illustrates that high level of operating slack, growing levels of operating risk also affect firm performance more positively when operating slack is munificence in the organization than when operating slack is insufficient. In figure 5.13c, finding is very similar to figure 5.13a and change difference is not very visible compared to figure 5.13a.

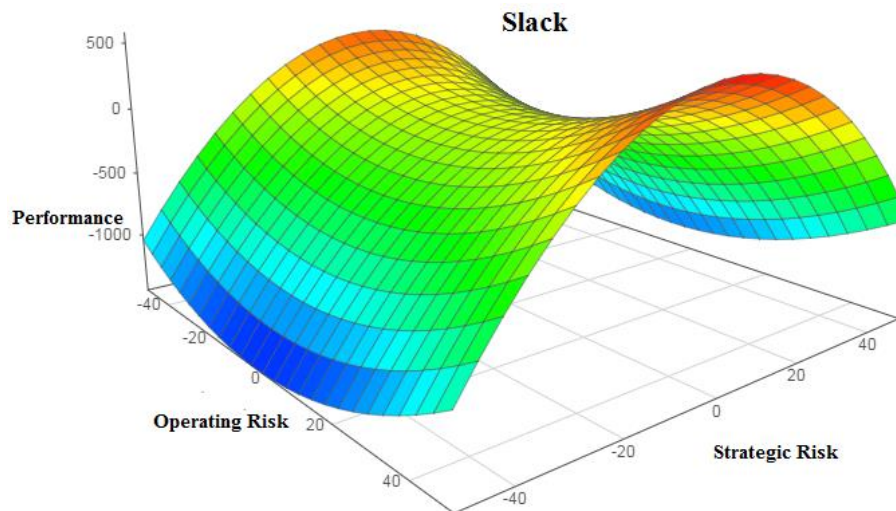


Figure 5-14- 3D graph for risk-slack-performance relationship

Figure 5.14 illustrates moderating effect of risk-taking capabilities on slack-performance curvilinear relationship. 3D graph indicates that operating risk is flatter when firms take too little or too much level of strategic risk.

These findings partially further support H6a and indicate that the optimal level of the *strategic risk* toward the left or right sides when an increase occur in the level of strategic risk. Figure 5.14 also illustrates the difficulties of the nonlinear relationship and moderating effect of risk-taking and is mostly supportive of the hypotheses (Chen et al., 2015).

### 5.5.2. The moderating effect of Risk-Taking Behaviour on organizational adaptation

Table 5.25 provides Pearson's correlation for each of the variables. The findings show that multicollinearity does not create an issue among measurements. Table 5.25 shows the findings of the FGLS regression conducted to investigate the impact of risk-taking behaviours and interaction with adaptability and alignment on firm performance.

In the modelling approach, recommendation of methodologists (Ganzach, 1997) was followed to include both the linear and quadric forms for the risk-taking behaviours, adaptability and alignment variables as well as recent evidence of slack's curvilinear relationship with firm performance (George, 2005; Tan & Peng, 2003).

The quadric forms of risk-taking and adaptation profiles and interaction variables significantly make model fit better, proposing the importance of the quadric forms and interaction variables in model 2. Comparing model 31 with model 29 and 30, a significant improvement was observed ( $\Delta\chi^2 = 2176.358$ ,  $df = 53$ ,  $p < .001$ ), offering support for the addition of interaction variables for alignment.

When adding adaptability instead of alignment into the model 30, there is an impairment in the model 30 compared to model 31 ( $\Delta\chi^2 = 1233.339$ ,  $df = 53$ ,  $p < .001$ ), but still depicts not a significant improvement when comparing with model 29 ( $\Delta\chi^2 = 3833.813$ ,  $df = 53$ ,  $p < .001$ ). Model 29 is a baseline model risk-taking behaviours and adaptation processes. Model 29 also adds the main effect of the control variables.

The insights obtained from the control variables are largely logical. Unsurprisingly larger strategic risk has a negative impact on firm performance ( $\beta = -0.145$ ;  $p < .001$ ). The findings further show that firms with higher operating risk have higher performance levels ( $\beta = 0.628$ ;  $p < .001$ ).

These firms are less likely to invest in R&D which takes time to materialize in greater performance. Adaptability is affirmatively and significantly interacted with firm performance ( $\beta = 0.238$ ;  $p < .001$ ). Similarly, alignment affects performance positively ( $\beta = 0.125$ ;  $p < .001$ ). There is a significant and affirmative interaction between industry concentration and performance ( $\beta = 1.182$ ;  $p < .001$ ). This finding also supports H3b and H3c.

Table 5-25 - Pearson correlation for risk-taking capabilities

	1	2	3	4	5	6	7	8	9
1 Tobin's Q	1								
2 Strategic Risk	0.0812	1							
3 Operating Risk	0.1705	0.0103	1						
4 Adaptability	0.115	0.2164	0.1072	1					
5 Alignment	-0.0377	0.0181	0.214	0.3388	1				
6 Prior Experience	-0.0375	-0.1505	0.0185	0.0955	-0.0108	1			
7 Firm Size	-0.182	-0.0151	-0.1219	0.1269	0.214	0.0254	1		
8 Firm Age	-0.0312	-0.0158	-0.1086	-0.0064	0.0258	-0.0214	0.1646	1	
9 Industry Concentration	-0.0138	0.002	0.0038	-0.0608	0.0051	-0.0159	-0.1269	-0.018	1

	Model 29		Model 30		Model 31	
Firm Size	-0.075***	(-8.44)	0.0004	-0.4	0.0038***	-4.19
Firm Age	0.001	-0.41	0.0001	-1.52	0.0002*	-2.08
Industry Concentration	1.182**	-2.46	-0.0476	(-1.20)	-0.0444	(-0.96)
Prior Experience	0.001***	-2.69	0.0005***	-10.39	0.0006***	-10.01
Strategic Risk	-0.145***	(-5.91)	-2.5400***	(-4.31)	-0.0788	(-0.07)
Operating Risk	0.628***	-6.8	-1.1864*	(-2.05)	1.2541***	-6.6
Adaptability	0.238***	-46.83	-0.9497**	(-2.75)		
Alignment	0.125***	-5.62			1.0328***	-5.69
Strategic R.* Operating R			1.9528***	-4	-0.2133	(-0.22)
Strategic Risk Square			0.0328***	-4.04	0.0125	-0.84
Operating Risk Square			0.4229	-1.83	-1.6526***	(-6.01)
Adaptability Square			-0.0687**	(-3.18)		
Adaptability*Strategic R.			2.0411***	-4.37		
Adaptability*Strategic R. Sq.			-0.0181***	(-3.79)		
Adaptability*Operating R.			1.7359**	-3.12		
Adaptability*Operating R. Sq.			-0.5868**	(-2.64)		
Adapt. *Strategic R.*Operating R.			-1.6596***	(-4.09)		
Alignment Square					-0.0112	(-1.83)
Alignment*Strategic R.					0.141	-0.28
Alignment*Strategic R. Sq.					0.0129	-1.6
Alignment*Operating R.					-1.5766***	(-5.08)
Alignment*Operating R. Sq.					0.6395***	-4.89
Align*Strategic R.*Operating R.					-0.1319	(-0.31)
Constant	-3.254***	(-16.03)	0.6818	-1.91	-2.7465***	(-7.30)
<i>N</i>	1342		1970		1423	
<i>df</i>	43		53		51	
<i>chi2</i>	3833.813		1233.339		2176.358	

Table 5-26 - The effect of risk-taking behaviors on adaptation – performance relationship

Performance variable = Tobin's Q

Model 30 and Model 31 present the two-way and three-way links of risk-taking behaviours and firm adaptability and alignment respectively. In Model 30, findings show that the relationship between both strategic risk ( $\beta = -2.540$ ;  $p < .001$ ) and operating risk ( $\beta = -1.1864$ ;  $p < .001$ ) and firm performance is significant and negative. As shown in model 30 in Table 5.26, the adaptability has a negative and significant influence on performance ( $\beta = -0.9497$ ;  $p < .001$ ). In the regression analysis, the interaction between performance and adaptability is affected by both strategic risk and operating risk.

The interaction variables of adaptability and strategic risk is associated positively and significantly with performance ( $\beta = 2.0411$ ;  $p < .001$ ). Similarly, the interaction effect of adaptability and operating risk is also positive and significant ( $\beta = 1.7359$ ;  $p < .001$ ) in model 30. The moderating effect of strategic risk and operating risk in two-way interaction indicates that the firms with higher strategic risk and operating risk are more likely to decrease level of firm-specific adaptability as a result of stronger risk behaviours.

To understand the practical implication of this significant interaction, a three-way interaction was also computed by adding both strategic and operating risk variables. At the high value of adaptability, the effect of strategic and operating risks was (-1.6596), representing around 166 percent increase in the mean degree of firm performance in response to change in firm adaptability. Model 30 also shows insignificant coefficients of three control variables on performance (-namely firm size, firm age and industry concentration).

In model 31, the interaction term between alignment and strategic risk and operating risk were entered. As expected, the term is significant and negative for operating risk, suggesting that organizations with greater current market risk are less likely to increase their alignment to environment. However, results show that the interaction of strategic risk and alignment variable has a positive, but insignificant coefficient ( $\beta = 0.141$ ;  $p < .001$ ).

Model 31 in Table 5.26 also indicates that firms with greater alignment tend to possess better firm performance when comparing with firms with low alignment oriented profile ( $\beta = 1.0328$ ;  $p < .001$ ). The three-way interaction term *alignment\*strategic risk\*operating risk* is negative and insignificant ( $\beta = -0.1319$ ;  $p < .001$ ) in model 3.

The findings support H11a and H12a that argues that strategic and operating risk mediates the positively the relationship between adaptability and firm performance. Additionally, it was observed is a significant curvilinear connection between adaptability and strategic risk from the findings. This finding also supports H11b.

Furthermore, the findings report that relationship between alignment and strategic slack is not curvilinear. Thus, H12b is not supported by the findings. In a similar way, findings show that operating risk mediates the positively the relationship between adaptability/ alignment and firm performance. While H13a is supported, H13b is not supported by the results that reported in Table 5.26. Because, operating risk is negatively associated with alignment. However, both H14a and H14b are supported by findings.

### 5.5.2.1. Graphical summaries of result

To illustrate the difference in the firm adaptation behaviour and firm performance under the level of risk-taking behaviours or vice versa, adaptability and alignment and performance relationship was depicted in figure 5.15 and 5.16. These visualizations also support the hypotheses that argue the curvilinear relationship between risk and adaptation in general. The findings show that there are strong illustrative support for curvilinear relationships between risk-taking capabilities and organizational adaptation capacities.

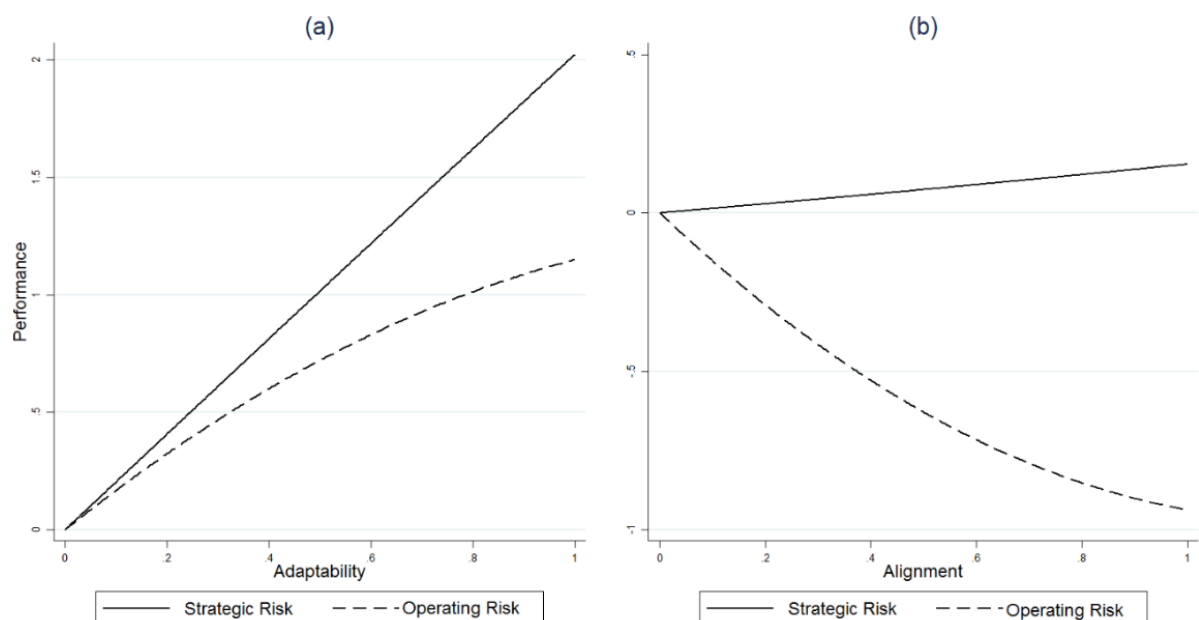


Figure 5-15 - Performance and adaptation behavior relationship under the different level of risk



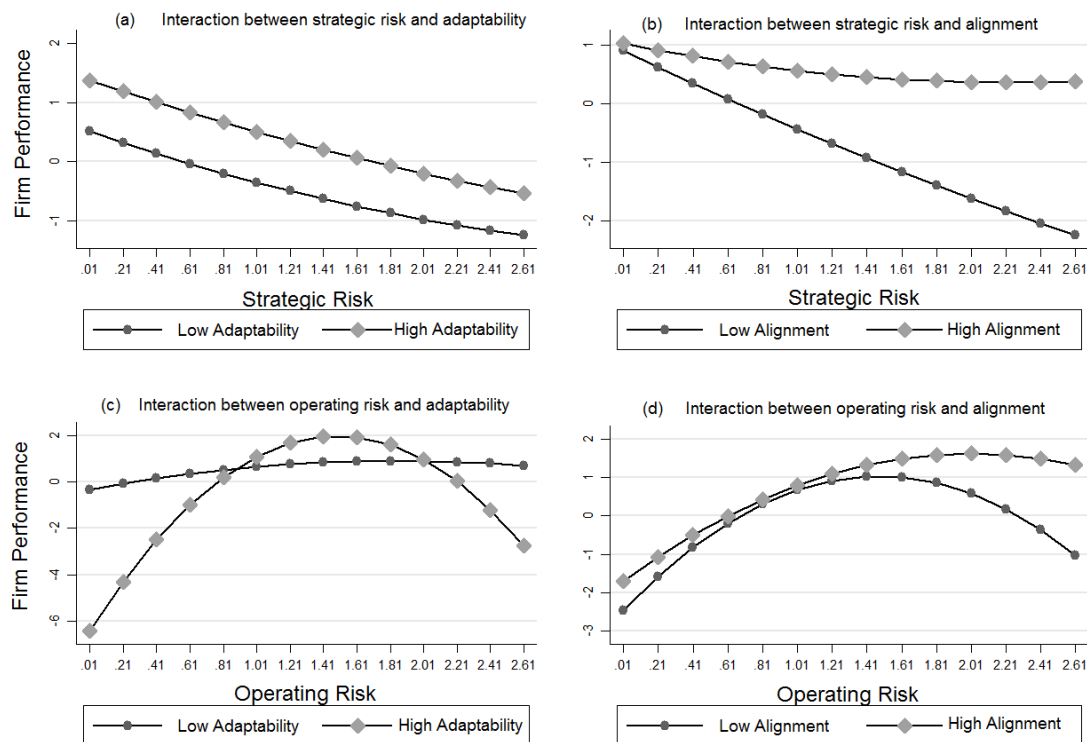


Figure 5-16 - Moderating effect of adaptation behavior on risk-taking and performance relation

To appreciate the interaction effects, the relationship between risk-taking behaviours were plotted at low and high level of adaptability and alignment<sup>149</sup> and calculated simple slope coefficients. Figure 5.16a demonstrates that the adaptability –performance interaction under the moderating influence of strategic risk and operating risk. When the strategic risk and operating risk increases, adaptability of firm to changes and firm performance increases. This finding evidences H12a. However, figure 5.16b shows that alignment-performance relationship depends on level of risk-taking behaviours.

<sup>149</sup> i.e., %25 percentiles and %75 percentiles levels were used to illustrate high and low level of moderator variable.

According to the findings, when strategic risk and firm alignment to current environment increase, firm performance- similar to figure 5.16a- increases. Contrary, when firm alignment and operating slack increase, then firm performance decreases. In other word, an increase in operating risk leads to negative impact on alignment-performance relationship. These outcomes, which are in line with prospect theory, propose that when managers behave in a risk-taking manner increases firm performance and firm adaptation to new environmental conditions.

A set of interaction margin plots was also provided to show those relations from the opposite angles, and this is where the really interesting results emerged. For example, figure 5.16a indicates that the link between performance and strategic risk at the degree of high and low adaptability. The interaction plots clearly depict that the impact of strategic risk-performance relationship on low and high levels of adaptability and alignment is generally negative. In other words, if strategic risk and performance increases simultaneously, then both adaptability and alignment slightly decreases (see figure 5.16a-5.16b).

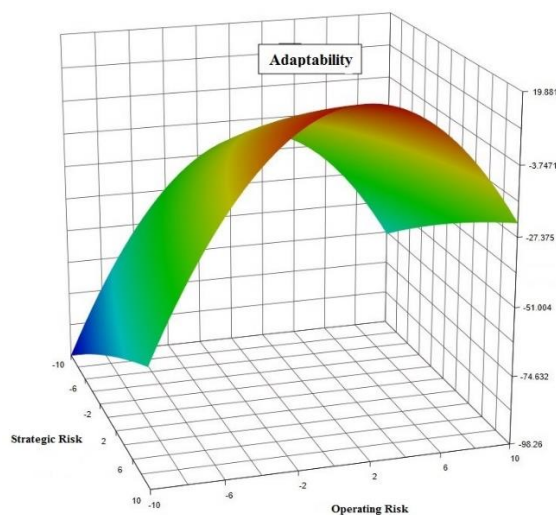
However, the impact of operating risk-performance relationship is U-shaped curvilinear in general for both low and high levels of adaptability and alignment processes. For example, figure 5.16c shows that while change in low level of adaptability is positive and flat, change in high level of adaptability is positive at a certain point, then begins to go down. On the other hand, the interaction plot of operating risk in figure 5.16d shows that curvilinear line is more flat and smooth compared to figure 5.16c.

In figure 5.17 (a-c), a 3D graphical rendering of the results employing surplus plots were demonstrated. The 3D surface plots describe the estimated performance differences in terms of risk-taking capabilities, based on the findings of model 30 and 31. The estimated performance is plotted in line with level of operating risk (current risk-x-axis) and strategic risk (y-axis).

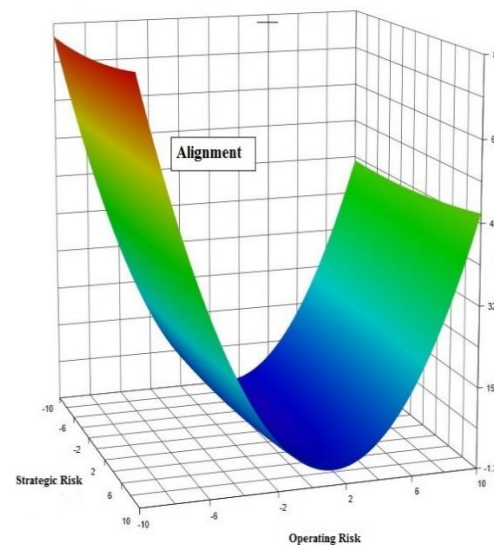
For example, Figure 5.17 (a) shows the results of firm performance for adaptability under the different level of firm risk-taking behaviour. The surface has an reverse u-shaped curvilinear link from right-to-left (as level of operating risk to strategic risk increases up to a certain level, then starting to decrease) and generally slopes upward from front to back on the figure 5.17a (as the strategic risk becomes less effective), in both models showing the main-effect results for those measures.

On the other hand, the slope for *strategic risk* varies evidently across the 3D plot, displaying the interaction impact between *strategic risk* and *operating risk*. That is, *operating risk* matters a great deal for organizational adaptability, so in the front of the figure 5.17a there is a distinct right-to-left upward slope reflecting gradually nonlinear relationship (curvilinear) with performance.

(a)



(b)



(c)

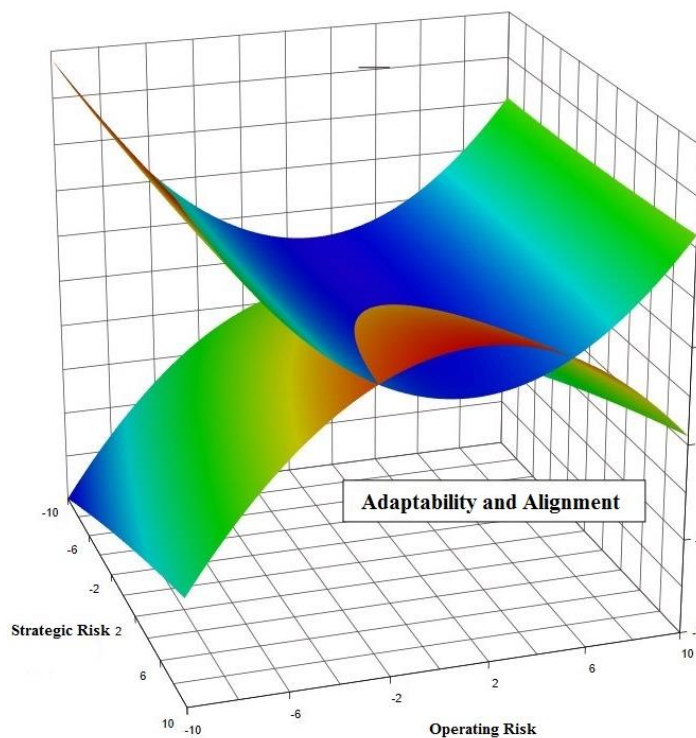


Figure 5-17 - Interaction between risk taking behaviors and adaptation-alignment oriented firm performance

Figure 5.17 (b) similarly indicates differences in Tobin's Q for alignment. The 3D plot of figure 5.17 (b) is noticeably lower than that of figure 5.17 (a), indicating the general superiority of *operating risk* as compared to adaptability.

The surplus shows a U-shaped nonlinear relationship between risk-taking behaviors and performance for alignment-oriented strategies. *Strategic risk* are predicted to boost firm performance in a wide range of circumstances, whereas operating risk are nearly generally associated with (sometime dramatically) lessened alignment-oriented performance. Similarly, the right-to-left downward slope as operating risk boosts is greater explicit than in figure 5.17(a). Figure 5.17 (c) shows combination of both interaction, display for adaptability and alignment oriented performances.

Their profiles are qualitatively similar to those in figure 5.17(a) and (b), though the surfaces are situated more positively in general. The related profiles indicate that the findings about risk-taking behaviours are robust.

### 5.5.3. Financial Crisis and Risk-Taking Capabilities

To scrutinize whether the rapport between financial crisis and risk-taking behaviours, separate regression analyses were first conducted for each period. Table 5.27 displays the outcomes of the separate multiple regression tests. Model 32 presents the findings for the before environmental jolt, model 33 for during jolt occurring and model 34 for after environmental jolt.

For each period, the coefficient for strategic risk, firm size, industry concentration, adaptability and alignment variables remain stable. The outcomes in Table 5.27 demonstrate that the constant beta for prior experience is significant and positive in model 32 ( $\beta = 2.047$ ;  $p < .05$ ). However, full model is significant in general.

*Strategic Risk.* As expected, the coefficient of strategic risk is significant and associated with performance positively ( $\beta = -0.220$ ;  $p < .001$ ) in pre-crisis period. Moreover, coefficient for strategic slack is significant ( $\beta = -0.928$ ;  $p < .001$ ) and slightly higher during environmental jolt when comparing to before environmental jolt in model 33. The constant beta for strategic risk index is also significant and in the anticipated direction in post-crisis period. When adding the interaction variables to the model 4, the constant beta for strategic risk index remains statistically significant and positive.

Table 5-27 - Financial crisis and risk-taking behaviors

	Pre-Crisis		Crisis		Post-Crisis			
	Model 32		Model 33		Model 34		Model 35	
Firm Size	-0.141***	(-7.41)	-0.099***	(-8.21)	-0.053***	(-5.03)	-0.080***	(-8.48)
Firm Age	0.005**	-2.66	-0.002	(-1.22)	-0.002*	(-2.37)	0.001	(-0.29)
Industry Concentration	1.047*	-2.39	0.177	-0.2	-0.915	(-1.82)	0.973	-1.69
Prior Experience	0.002*	-2.48	0.001	-0.11	0.001**	-2.68	0.001*	-2.43
Strategic Risk	-0.220***	(-5.24)	-0.928***	(-7.34)	-0.113**	(-3.08)	-0.176***	(-6.90)
Operating Risk	0.684**	-3.18	0.815***	-5.49	1.130***	-9.09	1.038***	-5.51
Adaptability	0.318***	-0.73	0.763***	-0.83	0.285***	-5.75	0.403***	-3.87
Alignment	0.349***	-5.93	0.183***	-4.86	0.116***	-4.38	0.155***	-6.27
Financial Crisis							0.218	-0.98
Strategic Risk*F. Crisis							0.056	-1.39
Operating Risk*F. Crisis							-0.291	(-1.48)
Constant	-4.466***	(-11.49)	-3.567***	(-13.15)	-3.904***	(-15.08)	-3.833***	(-13.67)
<i>N</i>	325		359		589		956	
<i>df</i>	32		32		33		37	
<i>chi2</i>	1624.006		2065.54		2173.107		3324.029	

Performance variable = Tobin's *Q*

*Operating Risk.* The coefficient for the operating risk in pre-crisis period has a positive impact on firm performance ( $\beta = 0.684$ ;  $p < .001$ ). Similarly, operating risk has positive relationship with performance in during crisis ( $\beta = 0.815$ ;  $p < .001$ ) and post-crisis ( $\beta = 1.130$ ;  $p < .001$ ) periods. In model 35, the positive impact of operating risk marginally increased when compared to pre-crisis and crisis period of models ( $\beta = 1.038$ ;  $p < .001$ ).

*Adaptability.* The coefficient of adaptability ( $\beta = 0.318$ ;  $p < .001$ ) in model 32 indicates that firm performance increases when investment related activities increase in pre-crisis period. Similarly, firm investment activities intensified during financial crisis through increasing firm flexibility ( $\beta = 0.763$ ;  $p < .001$ ). In model 34, adaptability is positively associated with firm performance after the financial crisis ( $\beta = 0.285$ ;  $p < .001$ ). In model 35, coefficient of adaptability is also significant and positive after inserting interaction variables ( $\beta = 0.403$ ;  $p < .001$ ).

*Alignment.* As expected, the coefficient for alignment in model 32 is positive and statistically significant and indicates that alignment ( $\beta = 0.349$ ;  $p < .001$ ) has a greater impact on the firm performance in pre-crisis period. Surprisingly, the coefficient of alignment is also significant during the financial crisis ( $\beta = 0.183$ ;  $p < .001$ ) and post-crisis periods ( $\beta = 0.116$ ;  $p < .001$ ). In addition, model 35 shows that alignment affects performance positively ( $\beta = 0.155$ ;  $p < .001$ ). These two findings regarding alignment and adaptability support H3b and 3c that predicted that adaptability and alignment is positively associated with firm performance.

*Controls.* Firm size has negative relationship with performance in all models as expected. The effect of firm size is ( $\beta = -0.141$ ;  $p < .001$ ) for pre-crisis period; ( $\beta = -0.099$ ;  $p < .001$ ) for crisis period; and ( $\beta = -0.053$ ;  $p < .001$ ) for post-crisis period; ( $\beta = -0.080$ ;  $p < .001$ ) for model 35. Firm age has positive relationship with performance in pre-crisis period ( $\beta = 0.005$ ;  $p < .001$ ) and model 4 ( $\beta = 0.001$ ;  $p < .001$ ). However, it is negatively associated with firm performance during the crisis ( $\beta = -0.002$ ;  $p < .001$ ) and post crisis periods ( $\beta = -0.002$ ;  $p < .001$ ). Industry concentration has a negative relationship with firm performance after financial crisis ( $\beta = -0.915$ ;  $p < .001$ ), while it is associated positively with performance in pre-crisis period ( $\beta = 1.047$ ;  $p < .001$ ), during the crisis ( $\beta = 0.177$ ;  $p < .001$ ) and model 4 ( $\beta = 0.973$ ;  $p < .001$ ).

*Interactions.* Model 35 shows main variables and interactions variables together. Surprisingly, there is not a statistical significance in between financial crisis and firm performance when adding interaction variables of risk-taking behaviours. For example, the coefficients of financial crisis ( $\beta = 0.218$ ;  $p > .05$ ) and interaction variable of *strategic risk\*financial crisis* ( $\beta = 0.056$ ;  $p > .05$ ) affirmative but not significant. Nevertheless, the constant *beta* of interaction of *operating risk\*financial crisis* ( $\beta = -0.291$ ;  $p < .001$ ) has a negative impact on the firm performance in Model 35.

## 5.6. Ambidexterity

Table 5.28 displays the basic statistical information and Pearson correlation of the predicted, predictor and control variables. The constant beta of correlation is measured after their transformations<sup>150</sup>. The correlation matrix shows partial proofs for multicollinearity: as can be seen in Table 5.28 none of correlation values exceeds 0.7, despite almost all variables are significant.

Table 5-28 - Descriptive statistics and Pearson's correlation

	Mean	SD	1	2	3	4	5	6	7	8	9
1 Adaptability	1.2255	1.0606	1								
2 Alignment	0.1801	0.4287	0.374	1							
3 Environmental Dynamism	0.2850	2.2852	0.5937	0.3931	1						
4 Strategic Risk-Taking	0.0663	0.2183	-0.0098	0.0481	0.1103	1					
5 Industry Concentration	0.1516	0.0904	0.0316	0.003	0.087	0.0943	1				
6 Firm Age	20.5493	14.4093	-0.1858	-0.0917	-0.1181	-0.0987	-0.018	1			
7 Firm Size	4.8856	2.0245	-0.0832	-0.1129	0.0671	-0.4936	-0.1269	0.1646	1		
8 Simultaneous Ambidexterity	0.5683	1.8664	0.2047	0.3132	0.2764	0.4591	-0.0267	-0.0725	-0.3803	1	
9 Sequential Ambidexterity	0.2994	1.4712	0.1205	0.1228	0.0368	0.1643	0.0346	-0.0498	-0.1332	0.1479	1

Tables 5.29 reports the Stata estimations of seven models. Adding variables of interest, as well as regulator variables, meaningfully enlarge the estimation at levels superior to ( $p < .001$ ). The control variables, despite being in the company of notional variables of interest- namely, operating slacks<sup>151</sup> as proxy to alignment, strategic slacks as proxy to adaptability, and two varieties of ambidexterity- significantly boost model-match, indicating the significance of control variables in the models.

<sup>150</sup> The transformation was used for R&D intensity for strategic slack, Cash for operating slack and for control variables.

<sup>151</sup> Two factor scores were used as a proxy to alignment and adaptability. As it can be remembered, alignment implies the a group of operating slack resources (MTBV, Cash and Sales per Employee), while adaptability represents group of strategic slack resources (R&D, Working Capital Ratio, Dividend Payout, Inventory Turnover and SG&A Expenses ratio).



Comparing model 36 with 37, a significant improvement ( $\Delta\chi^2 = 352.62$ ,  $df = 3$ ,  $p < .001$ ) was observed, giving corroboration for the addition of moderating variables, namely industry dynamism (or velocity), industry concentration and risk-taking.

When two forms of adaptation (adaptability and alignment) were inserted in model 3, there is additional enhancement in model fit ( $\Delta\chi^2 = 221.49$ ,  $df = 2$ ,  $p < .001$ ), with import for the positive coefficients for adaptability and alignment but only adaptability is associated with performance in Model 38.

Model 39 includes four possibility consequences for two variation of ambidexterity. Model 40 is significant and when comparing the model 39 with model 38, it was observed that significance of main effects model has also been increased ( $\Delta\chi^2 = 368.7$ ,  $df = -1$ ,  $p < .001$ ).

Inserting all interaction variables and main variables increased Wald chi-square value ( $\Delta\chi^2 = 3367.5$ ,  $df = -2$ ,  $p < .001$ ) when comparing with model 41. These constant betas from the model demonstrated for investigating the degree of empirical estimations were employed to assess the propositions. Model 36 exhibits the influences of the control variables upon firm performance. The model for the control measures are significant.

Moreover, in line with comprehensive series of past studies, firm size is consistent negatively affect performance ( $\beta = -0.0596$ ;  $p < 0.001$ ) whereas, inconsistent with prior studies, firm's age influences performance somewhat positive ( $\beta = 0.0008$ ;  $p < 0.001$ ) on firm's performance. Model 37 reports that environmental dynamism has a significant positive effect: one percent additional value increases Tobin's Q on average with 14 % ( $\beta = 0.0527$ ;  $p < 0.001$ ).

Table 5-29 - Resource ambidexterity and firm performance

	Model 36		Model 37		Model 38		Model 39	
Simultaneous Ambidexterity							0.9523***	-10.28
Simul. * Environ. Dynamism								
Simul. * Strategic Risk								
Simul. * Industry Concentration								
Sequential Ambidexterity							0.1016**	-3.26
Seq. * Environ. Dynamism								
Seq. * Strategic Risk								
Seq. * Industry Concentration								
Adaptability					0.0553*	-2.41	-0.0421	(-1.11)
Alignment					0.0019	-0.05	-0.9113***	(-10.78)
Environ. Dynamism			0.0527***	-0.8	0.0301***	-6.41	0.0700***	-5.46
Strategic Risk			0.5640**	-2.61	0.5565*	-2.07	-0.5827	(-1.71)
Industry Concentration			1.6432*	-2.38	0.9471	-0.85	-5.8467**	(-3.20)
Firm Age	0.0004	-0.35	0.0015	-1.21	0.0037	-1.71	-0.0151***	(-5.23)
Firm Size	-0.0385***	(-3.95)	-0.0113	(-0.88)	-0.0542**	(-2.97)	-0.1073***	(-4.22)
Year- 2004-2013								
Constant	0.8067***	-6.67	0.4474**	-3.02	0.6838**	-2.84	2.6108***	-6.24
Degrees of freedom	37		41		43		41	
Wald chi-square	328.62		681.24		902.73		932.39	

	Model 40		Model 41		Model 42	
Simultaneous Ambidexterity	0.8106***	-5.33			0.8341***	-6.35
Simul. * Environ. Dynamism	0.0215	-1.13			0.0212	-1.21
Simul. * Strategic Risk	0.3228	-1.35			0.4442*	-2.24
Simul. * Industry Concentration	-2.0498	(-1.95)			-2.2285*	(-2.44)
Sequential Ambidexterity			0.0583	(-0.45)	0.1338	-1.59
Seq. * Environ. Dynamism			-0.0353	(-1.20)	0.0501**	-3.02
Seq. * Strategic Risk			0.6134***	-7.23	0.4161***	-3.83
Seq. * Industry Concentration			0.8447	-0.67	-1.3687*	(-2.33)
Adaptability	0.0021*	-2.09	0.0056*	-2.46	0.0023*	-2.31
Alignment	-0.1655	(-1.47)	0.1699	-1.05	-0.1291	(-1.20)
Environ. Dynamism	0.0464**	-2.86	0.0089	-0.31	0.0390*	-2.37
Strategic Risk	-0.7679***	(-3.41)	0.5769	-0.65	-0.6564**	(-3.26)
Industry Concentration	-0.4355*	(-2.04)	-0.3617	(-0.70)	-0.4902	(-1.89)
Firm Age	-0.0078**	(-2.89)	-0.0059	(-0.85)	-0.0054	(-1.73)
Firm Size	-0.0733**	(-3.18)	-0.2520***	(-5.37)	-0.0954***	(-4.09)
Year- 2004-2013						
Constant	1.3785***	-3.54	2.6697***	-3.86	1.5137***	-4.17
Degrees of freedom	40		41		39	
Wald chi-square	1301.09		1323.71		4691.22	

Performance variable = Tobin's Q

Of the slack variables (model 37), all moderating variables seem to have a direct effect upon the performance ( $p < 0.001$ ). The effect of industry concentration ( $\beta = 0.5640$ ,  $p < 0.001$ ), is marginally higher than risk-taking variable ( $\beta = 0.0723$ ,  $p < 0.001$ ). The main hypothesis regarding ambidexterity is an analysis of the affirmative influence of resource ambidexterity on Tobin's q ratio, using two operational measurements. To investigate the good influence of resource ambidexterity on performance, two functional specifications (simultaneous and sequential ambidexterity) were employed in Model 39. Comparing model 37 with model 38, it was found that the additional of these two operational forms of ambidexterity increases considerably to predicting firm's performance ( $\Delta\chi^2 = 29.66$ ,  $df = -2$ ,  $p < 0.001$ ).

To test the set of premises, model 40 was also employed. H14a which conjectured a positive impact of concurrent ambidexterity on performance – received empirical support ( $\beta = 0.9523$ ,  $p < 0.001$ ). In addition, H14a – which indicated a positive influence of simultaneous ambidexterity – also obtained pragmatic support ( $\beta = 0.1016$ ,  $p > 0.10$ ). The constant beta of ambidexterity is developed after the testing for the leading effects of environmental dynamism variables. Environmental dynamism is positively associated with firm performance ( $\beta = 0.0700$ ,  $p < 0.001$ ), but impact of environmental dynamism was increased comparing with previous model. Including the main impacts on performance increases the faith in the analysis of the interplay of ambidexterity variables (Venkatraman et al., 2007). In addition to this, hypotheses 15b was rejected that predict that sequential ambidexterity is negatively related to firm performance.

It was observed that coefficients for Model 40 supports for the three moderating effects with simultaneous ambidexterity. Any of these three interaction variables in between simultaneous ambidexterity and moderating variables are not statistically significant. However, Model 41 shows that only interaction with risk-taking affects performance positively ( $\beta = 0.6134$ ,  $p < 0.001$ ).

The coefficient for the effect of strategic slack is major and positively associated with performance for model 5 ( $\beta = 0.0021, p < 0.05$ ). The same relationship for model 41 is positive and significant ( $\beta = 0.0056, p < 0.05$ ). Contrary, the constant beta for the effects of operating slack for model 40 is not associated with performance significantly and negatively ( $\beta = -0.1655, p > 0.10$ ), while it is positive and again not significant for Model 41. Model 42 reports that simultaneous ambidexterity ( $\beta = 0.8341, p < 0.001$ ) has an affirmative impact on performance, while sequential ambidexterity has not significant relationship ( $\beta = 0.1338, p > 0.05$ ).

Having insight into the pattern of variations linked to adaptability and alignment benefit a select number of firms over others. However, model 42 shows that temporal alignment between firms' operations and their environments inhibits performance enhancement to react to vagaries in their settings. The adaptability-alignment tension shows an essential compromise, but it has not been generally measured empirically in the organizational adaptation literature (Thongpapanl et al., 2012, Josephson et al., 2015, Voss and Voss, 2013, Bouzidine and Dupouët, 2009). The extent of assessment of this compromise was broadened as an organizational competency that provides crucial organizational productivity (i.e. slack resources), which impacts on firm's performance (i.e. Tobin's Q).

A systematic basis was developed to operationalize and conceptualize resource ambidexterity by observing the pattern of performance (Tobin's q) in the different environmental conditions. The core similarities in accumulating slack resources is a unique and influential methodology to measure and specify the accuracy of ambidexterity as a managerial competency. On an experiential level, the findings showed that robust composition verified by negative and small relationship between strategic and operating slack variables as well as 'divergent validity' between sequential and simultaneous ambidexterity.

The findings contribute to the promising investigation on the organizational slack. From the view of organizational management literature, the findings also confirm that prominence of organizational ambidexterity as a main construct. This study presented here is a strong way to encapsulate how companies effectively steer at the edge of adaptability and alignment trade-off over time.

## Summary

In chapter 5, the research question, research objectives and hypothetical constructs were statistically analysed in detail. To that end, several multivariate and multiple regression techniques were employed. Analyses were begun with a determination of financial crisis. Then, slack-performance linear and curvilinear relationship, mediating effects of environmental conditions, financial distress and high and low performer firms, risk-taking capabilities and finally resource ambidexterity were statistically examined, respectively.

# Chapter 6

## Introduction

This final chapter discusses the earlier demonstrated outcomes of the empirical analyses in details. Then, the conclusion of this thesis follow. The chapter 6 concludes with managerial implications of thesis for practices and theories.

## 6. Discussion

### 6.1. Discussion

The aim of this research<sup>152</sup> is to examine different forms of slack in different environmental settings that are associated with different performance implications. Using a wide range of panel data regarding 11 different manufacturer industries, findings show that amalgamated notions of slack-related theories lead to a more evident explanation for firm performance than each single theory.

The results of this research suggest that each evaluation gives an incomplete explication of the effects of synergy among organizational characteristics, risk-taking capabilities and environmental factors, and that they are interrelated in the construction of company performance. Nonetheless, companies need to settle tensions between these viewpoints by meticulously examining the circumstances of sudden environmental upsets. When restructuring internal firm factors to optimize balance, these perspectives and synergy, firms need to scrutinize and interpret both contingencies of their firm environment and the resource flexibility and resource commitment.

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<sup>152</sup> Here, this author endeavours to engage with a core debate in the SM on the link between slack and performance with reference to financial crisis of 2007-8. Diverse academic input has deployed the notion of organizational slack to explicate the sources of performance. Slack has been used a crucial feature to elucidate firm performance within various theories.

The results of this study also support the RBV perspective and the findings indicate that the existence of varying performance heterogeneity. The research further focused on change in slack in different sub-periods, which help to add to an understanding of insight of patterns of firms' behaviours that proves existing influence of the financial crisis. The findings evidence that slack can be seen as a source of flexibility in a timely manner. The findings also make contributions to current slack literature.

First, as Mizutani and Nakamura (2014) mentioned, most empirical studies have investigated the slack-performance relationship using contingency, linear or curvilinear views with certain inconsistencies in performance results. Therefore, this study contributes to previous researches by adding to non-traditional linear and curvilinear views of the slack-performance relationship and considering a financial crisis perspective- namely '*level of slack*', '*risk of slack*' and '*perception of slack*'.

However, given that forms of slack have indicated that they consisted of 'bundles' of resources, it seems that certain forms of bundle of slack resources lead to higher performance outcomes. The slack management process was employed in the study that offers<sup>153</sup> a better portrayal of how multiple forms and levels of slack resources are related to firm performance by identifying bundle of slack resources.

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<sup>153</sup> This study also offers the concept of "*adaptational slack*". This type of slack was designed to explain the *adaptation process*.



#### 6.1.1. Key Findings with Existing Knowledge

This thesis studied the slack - performance relationship under different external environments by taking advantage of the financial crisis of 2008-09, which provides a natural experiment opportunity for the study. Besides the management of slack, adaptation profiles are also examined by building the two-stage adaptation process model in concordance with different period of financial crisis. Based on empirical analysis and theoretical research, this thesis finds that slack management impacts the firms' performance as well as firms' adaptation to respond to financial crisis. The impacts come from two aspects, one is the financial crisis, and the other is the capability of slack management to adjust the firms' resources in response to financial crisis.

#### ***The key findings are as follows:***

Findings show that financial crisis has a negative influence on firm performance. The financial crisis served as wake-up call for managers to achieve optimum level of this relationship. The findings also show that financial crisis led to dramatic environmental changes, which provoke managers to adjust their level of slack resources and correspondingly adaptation strategies. This finding is also consistent with RBV and BTF theories. When reviewing the slack management on financial crisis through the lens of RBV perspective, it is seen that identifying, developing and deploying key resources to maximise firm performance is essential for firms before and during the financial crisis.

RBV also states that when firm resources are scarce and risky to be invested during the financial crisis, firms need to find alternative sources to deal with consequences of crisis (Palamida et al., 2015, Weigelt and Shittu, 2016, Shaw et al., 2013). Similarly, BTF suggests that adjustment of slack resources through financial crisis trigger adaptive search, achieve fit between environment and organization and provide various ways of adaptation (Deb et al., 2016).

According to this view, managers must be encouraged to respond quickly because slow response may lead to fail in organization in a rapidly changing environment (Peltonen, 2013) such as Ambinistrions firms. Another key finding is that almost all slack variables in pre-crisis period have a significant relationship with post-crisis performance (Hong and Shin, 2016, Lee et al., 2009). The essential distinction between before and after financial crisis is the net resource balance (Wassmer et al., 2016, Lee et al., 2015), which differentiates in different periods.

This finding also support both BTF, agency theory, RBV and RCT perspectives. The resource difference can be occurred because managers can be in conflict regarding their resources and they can change their mind overtime about beneficial vs detrimental construct or much vs less slack is better. These findings further support the idea of Wan and Yiu (2009) that resource differences in different periods also depend on level of environment and magnitude of environmental jolt.

Findings suggest that improving the pre-crisis resources, by bringing them up to the optimal level, could help post-crisis performance. Indeed, based on the estimated results, slack can be a facilitator or a buffer, as BTF suggested, so as to bridge the difference between pre-crisis and post-crisis periods (Deb et al., 2016, Collet and Philippe, 2014). Another key finding for study is that notions of adaptability and alignments are distinct construct (Vahlne and Jonsson, 2017).

Findings also indicate that each of adaptation process is unique in terms of their scope and therefore can be regarded as a potential source of competitive advantage (Canales, 2015). In addition, results show that there are four different adaptation profiles. Firms tend to choose their adaptation strategies when their slack resources are low (Mishina et al., 2004, Modi and Mishra, 2011)

This finding evidences that firms respond differently to specific environmental pressures through creating different adaptation strategies (Chakrabarti, 2015). Adaptation differences at firm-level occur mostly because of firms possess different forms and levels of slack resources. Therefore, resource position of firms play an important temporal role between adaptation and firm performance (Dolmans et al., 2014, Wang et al., 2016b). It is also important to note that pursuit of alignment and adaptability in an optimal level provides better firm performance (e.g., ambidexterity).

For example, ambidextrous firms are the most successful and resilient organizations comparing to other profiles because of successful implementation of adaptability and alignment with having higher level of slack resources (Vahlne and Jonsson, 2017, Martin et al., 2017). The results also indicate that the alignment-performance and adaptability-performance relationship are positively associated before, during and after financial crisis.

Another interesting finding is about environmental conditions. The results highlight the significance of slack in firm performance contributing overall applicability of classical management approaches to the environmental context. In consistent with the findings of Howell et al. (2016) and Girod and Whittington (2017), results show that environmental dynamism and munificence can be a critical factor for managers.

Environmental dynamism and munificence appear to significantly impact the observed relationship of slack and performance, but in a different ways. It is also observed from the findings that while firms that use mostly strategic slack resources in environmental hostility seems that improve firm performance positively, firms that use mostly operating slack resources in such environment face reduction in firm performance.

The results also clearly indicate that dynamic environment has a negative impact on firms with operating slack. However, results also show that munificence environments protect firms from the environmental turbulence by generating slack resources. In addition to this, findings indicate that firms that have either strategic or operating slack resources are positively associated with firm performance in munificence environment. On the other hand, the research findings suggest that higher performer firms are more successful companies and they have larger level of slack resources comparing to lower performer firms.

Furthermore, higher performer firms place much emphasis on R&D slack, marketing slack, market value slack and leverage slack in order to have better firm performance. However, lower level firms tend to give a higher priority to have larger level of market value slack in their overall approach. The findings indicate that only market value slack has a significant relationship with performance for all period for lower performer firms. The findings indicate that higher performing firms with higher level of slack outperform those with lower level of slack recommending a positive association between performance and slack resources. The results also indicate that alternative configurations of slack can result in various performance outcomes.

The results of this study strongly support the risk model. Slack appears to cause mainly two types of risk, namely strategic risk and operating risk. Different forms of slack resources may force organizations to capture different types of risk. For example, the findings confirm the positive association between strategic risk and performance for both higher and lower performing firms. However, the findings also indicate that while strategic risk is positively associated with overall firm performance, operating risk has a negative impact on firm performance.

Availability of strategic slack and lower level of operational slack both have an important influence on firm performance. Forms of slack is more likely to make diversifying firm risk-behaviours, particularly during the financial crisis. This findings are also consistent with prospect theory. Kumar et al. (2015) asserted that there is a sequence of related decisions overtime. According to them, managers become risk-seeking as prospect theory suggested, when they unable to adapt completely new environment and integrate their objectives with their current with positions.

Therefore, risk-taking under the negative pressure of financial crisis will increase if managers assume that they have insufficient slack resources during the financial crisis. Another significant finding is that relationship between risk-taking behaviours and firm performance is curvilinear and broadly show that relationship differ based on forms of slack resources. It means increasing risk-taking up to a certain level leads to increase in performance and then reason to decline. In other word, little or much risk-taking are bad for performance. Results also suggest that optimal level of strategy slack and operating slack resources lead to increase in risk-taking activities.

This finding also supports the prospect theory and the threat rigidity theory that balance the formation of clear risk boundaries up to a certain threshold. The inverse U-shaped curvilinear relationship shows this balance and importance of activated risk-taking behaviours. Analysis demonstrate that strategic risk and availability of strategic slack are among main drivers of risk-taking behaviours.

However, findings show that the simultaneous influence of both strategic and operating risk and strategic slack variable on firm performance is negative. On the contrary, the simultaneous influence of both risk-taking behaviours and operating slack variable on firm performance is negative. Furthermore, another interesting key findings is that the relation among a variety of risk-taking behaviours and adaptation process also varies. For example, strategic risk-taking increases firm performance during the adaptability and alignment process. However, while operating risk-taking is associated positively firm performance during adaptability process, it has a negative impact on firm performance during the alignment process.

Another important findings are that simultaneous switching between alignment and adaptability provide positive impacts on firm performance and thus achieving better firm performance. Thus, managers can be marshal their slack rapidly and benefit its flexibility to address environmental uncertainties. Contrary to expectations, this thesis did not find a significant relationship between sequential ambidexterity and firm performance. However, interaction effects of both simultaneous and sequential ambidexterity with environmental dynamism and strategic risk have positive relationship with firm performance.

In addition, both interaction with industry concentration is negatively associated with industry concentration. Adaptability and alignment can be regarded as two main sources of organizational adaptation.

Adaptation can originate from various forms of slack resources. Building on the current knowledge, simultaneous ambidexterity can be possibly derive all different forms of slack while sequential ambidexterity tends to lead to either adaptability or alignment process. The findings clearly show that smoothly switching between these two processes in a simultaneous way guarantees organizational adaptation.

### 6.1.2. Slack versus Performance

It was also conjectured that there would be many positive connections among multiple variables of excess resources and performance variable in pre-crisis, crisis and post-crisis periods. It was found support from the findings for the first objective of firm and H1a that there are many encouraging links exist among a multitude of measurements of slack and measurements of performance before, during and after financial crisis.

The findings also revealed that pre-crisis slack is significantly with post-crisis performance. This finding also verifies H2a. These results further support the idea of RBV that suggests that heterogeneous and greater resource capabilities make positive contribution to firm performance even if the environment changes. According to RBV, resource capabilities aim at allocating and deploying different resources to achieve superior performance. The level of slack is the key factor for this allocation and deployment.

However, the findings show that resource allocation of firms varies in different time-periods. For example, the findings of this study report that a substantial decrease in R&D experiments occurred during the crisis, while the firms continued to rise and consolidate their innovation position after the financial crisis.

A decline may occur because the financial crisis enhances the strategic option value of investments forcing firms to take the proper steps about their investment decision during the crisis. Despite decrease occurring in levels of R&D during and after a crisis, firm performance kept increasing at the same period. One possible explanation for this might be that, as resource constraint theory (RCT) suggests, less resources leverage firms to be more efficient.



Another possible explanation for decrease in the level of R&D is that a financial crisis may lead to an environmental mismatch and therefore may reduce the level of technological experimentations as a response to the environmental change. In addition, if exploration costs are too large to afford and their capabilities are insufficient to carry out exploration activities, then firm management considers that R&D development can be a financial burden for firms (Chen, 2008). As a result of this, management can eliminate excessive slack resources as best they are able.

However, the findings also confirm previous studies that argue that investment in innovation tends to improve performance<sup>154</sup>. Furthermore, these results are in agreement with Lee and Wu (2015):962's findings which showed that the "...*slack encourages investments up to a certain level, and beyond this then discourages them.*" Due to a resource gap, financial barriers, perceived risks or other reasons during and after the financial crisis.

RBV also suggests that the decision-makers have to be careful when dealing with maximization of liquidity and profitability if they want to achieve optimum working capital. Therefore, the managers must select the best suitable slack management strategies for the firm in different environmental conditions to be able to handle unexpected changes efficiently thereby increase firms' performance and maximize shareholders' wealth.

In this context, any making decisions on working capital is expect to have strong implications on the firms' operational efficiency and possible investments that will change the firm value and ultimately wealth of shareholders.

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<sup>154</sup> With consistent with (Chao, 2011, Chen and Miller, 2007, Chrisman and Patel, 2012, Greve, 2003, Lucas et al., 2015, O'Brien and David, 2014, Tyler and Caner, 2015, Wu and Tu, 2007, Yanadori and Cui, 2013).

However, contrary to expectations, the findings did not report any significant difference between working capital and firm performance in general (baseline model), although performance-working capital relationship is associated positively and significantly before and during crisis-(not after crisis). In addition, a substantial slowdown in working capital was observed during the crisis. Immediate reflection is that this is due to negative consequences of financial crisis. Another possible explanation for this is investing heavily in inventory that can affect firms negatively and increase the risk in term of firm profitability.

The findings also show that, as a resource-based view suggests, firms are not motivated well to managing working capital due to resource constraints. In addition, this might be because firms with higher investment in current assets have lower risk but they also have lower firm profitability. Mishina et al. (2004) explained that negative working capital refers to resource-stretching more than anticipated. Consistent with Mishina et al. (2004), the findings show that negative or less working capital indicates that a firm has limited resources, which are already being utilized for operational purposes.

The findings also show that working capital may be used, as a measure of the resource commitments, to generate investment options (e.g. investment excess resources that may constitute slack range from inventories, R&D, dividend, receivables and marketing expenses) after the financial crisis. These investment options create substantial factors as a means of working capital for flexibility (Houthoofd and Heene, 1997).

Similar to working capital turnover, the current study shows a positive but insignificant interaction between dividend and firm performance after the financial crisis, although it has significant relationship in general and before and during crisis. This may happened because of switching the use of slack resources during the environmental conditions change.

In collaboration with real option theory, for example, some firms can use ‘*option of switch*’ during the crisis due to resource constraints. However, there is a considerable decrease in effect of dividend on firm performance during the financial crisis reflecting temporary halts in dividend payments when compared to the pre-crisis period.

Reducing the dividend pay-out allows firms to accumulate more cash resources in order to meet new environmental demands. Additionally, firms do not always seek shareholder’s wealth maximization (Cannella et al., 2015). Rather, managers may prefer to invest cash reserves in absorbed slack resources for *future survival* or opportunities rather than distributing dividends to regular investors.

When temporal constraints (begin with onset of the financial crisis) increased around the firm environment, according to findings, this led to the payment of less dividends for firm’s operational tasks during and after financial crisis (Maruping et al., 2014). The findings indicate that dividend pay-out is a crucial factor influencing firm performance. This also indicates the higher the profitability of firms means the higher dividend pay-out. These findings mostly support the idea of RBV in general.

What is surprising is that the coefficient of inventory is insignificant, in general, despite being positively associated with firm performance. With regard to sub-periods, inventory is only significant in a post-crisis period. A possible explanation for this result may be the *lack of sufficient resources* in the organizations.

This may have happened because of management’s decisions are related to investment that may affect the level of inventory turnover. For example, the low level of inventory turnover refers to the firms that must invest larger resources in manufacturing processes (e.g. raw material, work-in-process or finished goods). Put differently, it implies lower sales and, therefore, excess inventory.

It seems obvious that accumulating excess inventories are likely to be a result of financial crisis. This result also shows that decreasing inventory turnover is most likely to slow down the firms' acceleration of creating adaptability that can cope with unexpected surprises. This is because, during a liquidity crisis, firms inherently tend to reduce inventories to free up cash that is crucial to enhance firm flexibility for achieving adaptability and crucial to avoid burden of crisis. Contrary to expectations, the findings also did not observe any significant difference between inventory turnover and performance in general.

Existing empirical evidence also indicates the growing significance of *marketing slack* (SG&A) regarding operational activities and subsequent financial performance. The theoretical underpinning for elucidating the positive association of marketing slack with financial performance stems from the RBV. RBV indicates that achieving better performance lies in the marketing of unique resources. It is clear from previous arguments that marketing activities strongly influence firms' investment decision. The findings evidence that slack allocation and change of current activities in different environmental conditions can influence the firms' marketing and *resource commitment*. The findings also report that slack allocation does not change current marketing commitment, but changes future marketing commitments.

However, another important finding was that SG&A and performance is significantly and positively associated. One unanticipated outcome was the insignificant connection between marketing slack and performance in the *pre-crisis* period.

It seems possible that these results are due to increase in total revenue being more than the increase in marketing expenses. It is difficult to explain this result, but it might be related to consolidating key marketing functions or discontinuing long-standing but low value added marketing activities before the financial crisis. In addition, marketing expenses (SG&A) are the prime targets for *cost-cutting*, if managers pursue such a *cost-cutting strategy*.

If so, the observed increase in SG&A during and after financial crisis could be attributed to such a strategy. It is also well known that firms with higher market ratio indicate presence of higher current opportunities and thus a higher level of firm performance (Hovakimian et al., 2001). This argument seems to be consistent with the finding found that relationship between performance and MTBV is positively and significantly associated.

However, The findings show that firms prefer to keep lower future investment goals by concentrating on improving the market value in order to mitigate the environmental adaptability issue when future uncertainty arise. In addition, firms with higher market-to-book value actively helps firms to accumulate internal resources and that is one of the explanations of the positive relationship between alignment to current environment and firm performance.

Results also reveal that higher level of *market value slack* would facilitate limitation of capital and boost the strategic options for resource commitments with positive performance implications by meeting shareholder expectations (George, 2005, Mousa and Reed, 2013). Since MTBV reflects reputation<sup>155</sup> of firms and firm's relative success in fulfilling the expectations of shareholders, drop in MTBV after crisis echoes shareholders lack of confidence with higher required Tobin's q value will have higher market's expectation of the firm's cash flows and earning power.

Surprisingly, no differences were found in the coefficients of cash during crisis and in the post-crisis periods. However, the coefficients of cash are positive and significant in the pre-crisis and general model. There are several possible explanations for this result.

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<sup>155</sup> The MTBV mainly echoes the firms in delivering robust growth, operating performance and in the firm stock valuation.

A possible explanation for this might be that failure or bankruptcy during and after crisis periods. This is because, decreasing the firm sales inhibits firms from having positive cash flow, and generating more cash slack. Thus, it facilitates failure and bankruptcy for firms.

From an agency theory perspective, decision-makers may prefer to use cash resource to pay the dividends to their shareholders or their private benefits (agency problem). (Chen and Chuang, 2009, Dittmar et al., 2003, Jensen, 1986). From the RBV and BTF perspectives, *cash slack* can create flexibility to absorb sudden environmental changes by providing low-cost financing for future.

However, the findings do not support this argument for during and after financial crisis. This rather contradictory result may be due to invest excess *cash slack* in R&D, investing in new buildings, building new laboratories, purchasing equipments or investing in advertisement for future survival or opportunities during and after financial crisis. This inconsistency may be due to the nature of cash resources, inefficient management of receivables or positive change in sales with not similar level increase in cash itself. From the RBV theory perspective, *cash slack* is not unique, rare or difficult to immitate, although it is necessary for achiving alignment and thus obtaining superior firm performance (Latham and Braun, 2008).

As a result, firms are most likely to find external resource and this is most likely to increase firms' resource dependencies to external factors (Patzelt et al., 2008) during and after financial crisis. Therefore, the finding is contrary to previous studies which have suggested that *cash slack* improves prospects for growth and future survival (Zahra et al., 2006) for during and after financial crisis periods.

However, firms can replace or adjust their daily routines in order to adapt to new environmental demands. According to the findings, *cash slack* plays a critical role in general (baseline model). For the general model, the findings support the perspective of BTF that suggest that cash slack can increase shareholder's wealth when used to unfolding contingencies but not for sub-period models (during crisis and post-crisis periods).

Dismissing the fact that during and after crisis, firm performance has a positive relationship with *cash slack*, consistent with the notion that firms with future growth opportunities will want to hold cash balance. Also, these results confirm with (Kim and Bettis, 2013, Deb et al., 2016, Arslan et al., 2014)'s findings that as an unabsorbed slack resource, cash holding significantly contribute to firm performance.

Theoretically, in term of RBV, employee slack means rare and absorbed human resources that are very skilled and specialized (Lecuona and Reitzig, 2014). Human resources are very rare because acquiring skilled personnel are not easy in a competitive environment and it is absorbed because the resources are invested for the long-term in the firm's current activities. The human resource strategy is important for firms because pairing with best similar derived form of adaptation strategy provides firms to maximize their performance.

These results are also consistent with BTF perspective that argues that *employee slack* makes contribution to firm performance depends on its capacity to promote anticipated number of employees (Shaw et al., 2001). It was also observed that there is a small reduction in impact of employee utilization during crisis. A possible explanation for this might be that initial shock wave of financial crisis. Employee utilization, however, slightly increased after the crisis.

This may be explained in that *employee slack* is stem from qualified and skilled human resources that are considered to be critical to the firm success (Haber and Reichel, 2007) during and after the environmental jolt. Employee slack thus creates a long-term competitive advantage by improving short-term human resource performance along with providing employee protection against competitors with regards to critical operations (Barney, 1991).

Overall, sales per employee is affirmatively and significantly associated with firm performance. The asset turnover, the overall impression is that firms are faced with inefficient asset turnover difficulties caused by financial constraints and negative consequences of financial crisis. A positive impact of sale to asset ratio on firm performance, the influence of this variable is significant only after the crisis. However, the coefficient of asset turnover ratio is positive and significant in post-crisis period and general model. Firms with lower asset utilization slack also indicates low alignment to current operations by means of having cash flow that are created for a given level of asset (Aras and Kutlu Furtuna, 2015).

However, from an agency theory perspective, low-level of sales-to-assets ratio would indicate asset deployment for unproductive purposes (Tarhan et al., 1998) and misusing of existing current and fixed assets by the managers. (Singh and Davidson, 2003). According to the findings, it seems that the sales-to-assets ratio refers to how difficult firm's asset being utilized (Grablowsky et al., 1982). Firms with low asset utilization indicates that the firm is working far away to its maximum capacity, making it more vulnerable to reducing redundant current and fixed asset costs.

The findings also indicates that a misalignment between firm strategy and firms' asset management was occurred and it is most likely to harm future survival of firms due to reduce generating either equity method revenues or dividend revenues, depending on environmental conditions.



It is proposed by the proponents of BTF and RBV that higher level of leverage slack encourages superior firm performance and suggest a positive slack-performance relationship (Geiger and Gashen, 2002). However, according to agency theory, existence of leverage slack leads to ‘potential’ misuse of resources by managers because it is accumulated slack resources from current ‘potentially’ available external resources (Guha, 2016, Balcaen et al., 2011).

However, similar to asset utilization, the empirical findings show that the performance-leverage relationship is significant and positive in post-crisis and general model. This relationship is negative but not significant before and during financial crisis.

A possible explanation for this might be that firms was caught unprepared to financial crisis and thus inability to apply existing plan to operate their routines that mainly rely on their own internal resources of financing (retained profits) before and during financial crisis. The lack of a significant connection between firm performance and leverage during the crisis could be attributed to other factors such as high cost of external financing and therefore high exposure to financial risk.

The empirical findings also revealed that leverage slack can mitigate risks and enable the firm to survive before and during the environmental turbulence (Tan and Peng, 2003). Generally speaking, firms are able to survive until their stocked excess resources are run out (Gimeno et al., 1997). The need for leverage slack resources is therefore particularly important in environmental uncertainty (Cheng and Kesner, 1997, Latham and Braun, 2008, Sharfman et al., 1988).

However, increasing leverage slack is most likely to reduce liquidity of firms during and after the financial crisis. According to agency theory, a high leverage slack will increase firm risks and accelerate the likelihood of financial distress and bankruptcy and thereby minimize ability to create funds for firms' investment by borrowing (Froot et al., 1994). The empirical findings also confirms these arguments.

### 6.1.3. *Adaptation Process vs Performance*

This thesis also contributes to the organisational slack and adaptation literatures from various perspectives. First, the findings suggest that organisational adaptations are continuous rather than dichotomous constructs and companies may choose to use varying degrees of adaptability and alignment which will correlate with fluctuating slack configurations and performances.

The findings which are also confirmed are in line with previous research that employed related concepts in operationalising organisational adaptations in this study (Evans, 1991, Greenley and Oktemgil, 1998, Venkatraman et al., 2007, Chakravarthy, 1982).

Four distinct adaptation profiles are found as *ambidextrous*, *ambisinistrous*, *adaptability oriented* and *alignment oriented* firms which are clearly differentiated along the combination of high- low levels of both alignment and adaptability dimensions which in turn are defined in terms of operating slack ( for alignment dimension ) and strategic slack ( for adaptability dimension ). Resulting four distinct adaptation profiles are connected with divergent levels of performance and with wavering levels (high- low) and forms of organisational (operating-strategic) slack.

These findings confirm and support the earlier works of Miles et al. (1978), Chakravarthy (1982; 1986 ) and Oktemgil and Greenley (1997) as they were founded on a set of measures for the purpose of comparative measurement of organisational adaptation however those have not been previously researched before, during and after a financial crisis. The outcomes also show a positive interaction between *ambidextrous* firms and their performance, confirming some of the previous ambidexterity research (Junni et al., 2013, Lubatkin et al., 2006).

Despite some arguments presented by scholars, such as (Porter, 1980, Porter, 1985) that simultaneously pursue multiple strategies that may run the risk of culminating stuck in between the approaches, the findings suggests not only the firms should align with their current environments but should also invest simultaneously for managing future contingencies for the benefit of higher performance. It was also found that ambidextrous firms' performances were the least affected by financial crisis and these firms more or less sustained their performance with no significant performance change during and after financial crisis.

It can be therefore conclude that ambidextrous companies with large operating and strategic slack are the most *resilient* and *robust* and profitable among the four types of firms studied therefore most able to withstand or recover quickly from the conditions of financial crisis. The lack of significance in their slack management before crisis, during crisis and post crisis stages indicate their robustness and resilience despite major changes in the environment during that period.

The findings for ambisinistrous firms with low operating and low strategic slack however were completely opposite to the findings for ambidextrous firms. These firms have the lowest performance compared to other profiled firms and their performance continue to decline even after the financial crisis. These firms are very similar to Miles et al. (1978)'s (1978) reactors or Porter (1985)'s stuck in the middle companies as briefly discussed in literature section. This finding also support both RBV and BTF theories.

The performance results for *adaptability-oriented* and *alignment-oriented firms* were mixed. Both profiles had their performances significantly dropped during the crisis but both groups improved their performances after the crisis. For *alignment-oriented* firms with their pre-crisis resource availability higher than their resource demand make them more passive during crisis.

This behaviour is in accord with earlier results of Kraatz and Zajac (2001), that organizations with accumulated slack is less liable to undergo a sense of haste regarding adaptation to future crisis, and their passive behaviour may be the reason of their performance detriment at the beginning of the crisis. For adaptability-oriented firms the decline in their performance at the onset of crisis was not expected since their pre-crisis slack investment should have improved their adaptabilities during the crisis.

Two possible reasons can be attributed to this finding: firstly, due the fact that it takes time for options to be readily available after their initial investments, and secondly, slack *recovery* from strategic slack, which could be used during the crisis can be difficult and time consuming because of its absorbed nature in firms' operations (Tan and Peng, 2003).

For both *adaptability* and *alignment*-oriented firms the results have shown that their performance improved significantly after the crisis was over. In line with the previous arguments on strategic flexibility during crisis (Bahrami and Evans, 2005)- also see literature section ) this may be due to their pre-crisis high operating or high strategic slack strategies which may give them *corrigibility and liquidity* to move out of the crisis swiftly and effectively. For both *adaptability* and *alignment* oriented firms there were some significant changes in their slack deployment patterns across the crisis period. *Alignment oriented* firms reduced their already lower level R&D and SGA expenses after the crisis to improve their liquidity.

This was expected because of their minimal emphasis on future investments. On the other hand adaptability oriented companies lessened their dividends in spite of a notable decrease in their MTBV during the environmental jolt.

This is somewhat expected, since contrary to alignment oriented firms they put high emphasis on future investments and as a part of their high investment profile they forego dividends for the sake of future investments in R&D and working capital.

As expected ambisinitious firms were worst –off in terms of slack management. Their already depleted operating and strategic slack levels had further hammering during and after the crisis. Both market to book value and employee utilization were significantly down during the crisis reflecting their inefficiency and ineffectiveness. The significant cost cutting by reducing R&D and dividends pay-out did not materialise as better performance after the crisis. One other contribution of the research is on organisational adaptation research methodology.

The majority of the studies on organizational adaptations are generally conceptual, and most of the empirical studies, (Hutcheon, 2012, Kiss and Barr, 2014, Sternad et al., 2011, Ward and Rana, 1999) of organizational adaptation so far preferred to use a qualitative-based approach (Armenakis and Bedeian, 1999, Fugate and Kinicki, 2008, Baard et al., 2014) and case study methods (Hansen and Jacobsen, 2016) rather than quantitative-based methodology making it difficult to conduct comparisons of larger databases in a single industry.

Additionally although recent few studies related to organizational ambidexterity have used mix-method research models. The deployment of quantitative-based research method and employing objective dataset assisted in the exploration of comparisons related to slack variables with a comparatively wide-ranging database at diverse phases.

Additionally although recent few studies related to organizational ambidexterity have used mix-method research models (Birkinshaw and Gibson, 2004, Birkinshaw and Gupta, 2013, Bouzdine and Dupouët, 2009, Venkatraman et al., 2007) , none of them employed a fully accounting-based quantitative research method in the context of a financial crisis. The use of a quantitative-based model to more thoroughly describes underlying processes at organizational adaptation within a changing environment.

Additional contribution of this study was to operationalize and test Chakravarthy (1982) concept of “process of adaptation”. Chakravarthy (1982) classification of organisational adaptation suggested a two-cluster solution in terms of operating and strategic slack as proxies in his operationalization (Chakravarthy, 1986). This study verified his findings with two cluster solutions of operating and strategic slack as the two proxies for alignment and adaptability components of adaptation.

The two-cluster solution, is then used to create hybrid adaptation profiles and evaluate the extent to which the firms comprised in panel data emphasize each different adaptation profile. One of the ramifications of this study is the provision for testing organisational ambidexterity in different industry settings by using operating and strategic slack as two related but yet two independent variables.

This could be a useful contribution firstly because ambidexterity literature lacks the integration of organisational slack literature in ambidexterity research and secondly this makes provision to test both simultaneous and concurrent nature of ambidexterity on firm performance by using operating and strategic slack as proxies for adaptability and alignment dimensions of ambidexterity. Previously, the greater portion of slack literature debated whether slack was good or the opposite (Mosakowski, 2002, Deb et al., 2016, Nohria and Gulati, 1996) with conflicting results in lieu of focusing on how much of the nature of and the extent of good slack and performance.

This study takes its place amongst a handful of studies with few and notable exceptions (Mishina et al., 2004, George, 2005) on finding answers for *how much* slack (low or high) in *what form* (strategic – operating) and *when* (during crisis and post-crisis periods) is good for performance. The other contribution of this research is its deployment of both operating and strategic slack measures together.

This is theoretically meaningful and important for various reasons. First, using operating and strategic slack together separates resource availability from the resource demands placed on the system. By doing so, it emphasizes the temporal patterns of an organization's resource generation and deployment profiles, as the goals and the needs of an organization evolve in a dynamic competitive landscape (George, 2005).

Secondly, the contradictory findings of whether slack is good or slack is bad debate might owe its origin to the notion that excess resources are dependent upon tempo of resource utilization of a firm. Slack gauged cross-sectionally in pre-crisis period will have a relationship with performance after crisis or when crisis occurs provided they are utilized or committed. Hence, since both *operating* and *strategic slack* were employed in the study, the findings are more forceful in scrutinising the unexpected fluctuations in relationship between excess resources and performance. Thirdly, slack is an active capacity that embodies the gap between the resources actually available (i.e., *operating slack*) by a company and the resource demand (i.e., *strategic slack*) of a firm.

The notions of operating and *strategic slack* is essential. Although two different companies may benefit the similar degree of operating slack, strategic slack may actually make difference in the resource demand. Therefore, two companies would have diverse degree of excess resources and therefore, differ in specific *adaptation profiles*. However, it is ambiguous why the amount of operating slack owned by a firm should be relevant to adaptation and performance during or after financial crisis.



#### 6.1.4. Financial Crisis, Environment and Adaptational Slack

The third objective in this study sought to determine to clarify whether strategic slack and operating slack are balancing and jointly strengthening , or are interchangeable and to decide whether these rapports are regulated by environmental factors. It was also hypothesised that financial crisis dummy has a negative influence on firm performance. As mentioned in the literature review, financial crisis influences most industries, which make it difficult for firms to search niches that may isolate organizations from negative consequences of crisis.

Financial crisis also involves a major retrenchment in resource-flexibility and resource-commitment over a period of time (Dolmans et al., 2014, Wan and Yiu, 2009). The results evidenced this relationship. According to findings, a strong link between effect of environmental jolt and performance has been reported in the literature. The findings match those arguments observed in earlier studies.

This finding also confirms H5a that financial crisis dummy has a negative interaction with performance. In addition, the research was hypothesised that interaction between financial crisis dummy and strategic and operating slack is related to firm performance and thus firms with higher level of strategic and operating-slack lower their burden of global financial crisis. The findings indicate significantly negative interaction between strategic slack and financial crisis and significantly negative interaction between operating slack and financial crisis. Accordingly, this evidence supports both hypotheses 5a and 6a, respectively.

The two-way interaction findings mostly support the theoretical notion argued in the conceptual model that financial crisis congruence between different form and level of slack resources may be a source of flexibility that create strategic options for future. Another aim of the research was to establish whether these relationships are moderated by environmental factors (e.g. industry factors) such as munificence and dynamism.

This finding detects and evidences that slack measures have a reverse U-shaped curvilinear link with performance. The coefficient for linear terms of both strategic and operating slack are positive, while the coefficient for the squared terms are negative. These findings are also consistent with past studies (Bradley et al., 2011b, Tan, 2003) and findings confirm these studies.

The 3D surface plots also revealed this intricacy of the nonlinear relationship (curvilinear) and the controlling role of slack is generally helpful to the hypotheses. The empirical results presented some significant influences of environmental munificence and dynamism on firm performance. The two-way interaction findings reported that all two-way interactions of operating and strategic slack variables are significant in terms of moderating impact of dynamic environment. This provides clear evidence that environmental velocity is a significant environmental condition influencing the slack-performance relationship.

It is also found that the interaction effects between dynamism and operating slack have a negative implication on performance. It could be happened because of raising in environmental velocity in an industry may endanger a firm's survival due to lack of proper response capability with the necessary changes and thus managers may facilitate resource commitment activities to mitigate the impact of environmental dynamism.

However, findings also show that the interaction between environmental munificence and both operating and strategic slack have positive impacts on firm performance. The findings also show that a munificence environment represents industry growth and opportunities that allow firms for generating firm resources by means of accumulation of high excess resources and thus munificence can enable firms to create a long-term adaptation strategy and investment routines.

The surface (3D) plots succinctly shows that firms with high (or align with) level of dynamism and munificence environment will have superior performance and can significantly enhance their performance by increasing their operating slack simultaneously. However, firms with high operating slack and in only high munificence environment will have lower firm performance. This result also confirms by agency theory claim that higher-level slack resources lead to misuse or inefficiency on performance.

However, the inclusion of these two-way interactions and quadric terms for strategic and operating slacks presents the possibility of detrimental multicollinearity among the measures. Following the Bradley et al. (2011b), the measures were mean-centred (data transformation) to reduce the bias because of high correlations between higher order terms and the interactions and the baseline effect measures.

The findings so far support that environmental munificence is positively associated with slack-performance relationship. However, the findings partially support that environmental dynamism is positively associated with slack-performance relationship. Finding supports only strategic slack resources that improves firm performance in relatively highly dynamic environment.

Overall, the results supported the core thesis that most of slack variables were positively associated with firm performance. Additionally, this research found that the influence of excess resources is barely linear. Rather, such outcome is more akin to a nonlinear connection between excess resources and performance.

#### 6.1.5. Financial Distress and Higher and Lower Performance Firms

The next goal of thesis is to comprehend the existing distinctions between high performer and low performer firms based on 'performance distresses' throughout the given periods. The first phase of this section explains the pattern of performance differences is altered when performance distress is considered.

Other objectives are to determine if the behaviours of strategic risk and operating risk are distinct constructs for manufacturer firms and to establish whether these rapports are influenced by risk-taking factors such as these two risk-taking capabilities. In the study, mean level of each high performing and low performing firms were also compared by using *t-test*.

Findings suggest that higher performance and lower performance firms have significant differences before, during and after financial crisis. Firms with high performer firms will perform at a higher level than firms with low performer firms. In pre-crisis period, low performer firms appear to stay more focused on generating slack resources comparing with high performing firms in pre-crisis period. It also evidenced that higher performing firms have more Tobin's q ratio than low performing firms for each period and over-time.

There are several possible explanations for this result. A possible explanation for this might be that high performer firms may pursue risk-seeking strategies. They allocate their slack resources in order to pursue aggressive firm strategies through applying adaptability process. Thus, they can find a solution for short-term responses to immediate crises. However, in terms of low performer firms, threat rigidity theory suggests that managers may reduce their flexibility following crisis and this may lead to low performance for firms (Shimizu, 2007).

Performance distress can be expected to be lower in conditions of environmental uncertainty or when resources in environment are very limited. However, it shows that higher performing firms have more fluctuated than low performing over-time. This relationship may partly be explained by the average volatility raises during the financial crisis. This increase could be lead to some degree of fluctuation in performance overtime.

However, findings also evidenced that higher z-score firms have better ex-post performance than lower firms. As expected, the findings evidenced that financial crisis increases firm's risks. The coefficient of interaction of post-crisis and firm performance, which captures the impact of interaction variable has no effect on the risk, is insignificant regardless of methodology employed. The findings suggest that there is a positive association between post-crisis performance and z-score and interaction of post-crisis dummy and performance and z-score.

#### 6.1.6. Risk Taking Capabilities vs Performance

In this study, it was considered that how *risk-taking capabilities* influence the relevance of arguments about slack-performance relationship. In addition, how powerful *financial distress* affect slack-performance relationship was also considered. Furthermore, moderating impact is changes by the *level and form of slack*. Particularly, findings underline the significance of considering risk-taking capabilities in arguments regarding the level and form of slack management. The study was also contributed to management literature by concentrating on both *adaptational slack* and *adaptation processes*, whereas scholars largely focus on traditional forms of slack resources in the past (Zambuto and Nigro, 2014, Xu et al., 2015).

The adaptation literatures were extended by exploring the idea that slack management may increase or inhibit risk-taking capabilities. Most of adaptation studies have focused on organizational learning, exploration and exploitation strategies but has largely disregarded the notions that (1) risk-taking capabilities may be influenced on slack development, and (2) that these capabilities may also serve to increase adaptation capacity of firm rather than just restrict organizational characteristics (*resource capability and adaptation capacity*).

Research also contributes to slack and ambidexterity literature by examining the function of risk-taking capabilities in the slack-performance relationship. The adaptation process is important but mostly ignored firm-level activities whose mechanism has been questioned. In this section, this process was also shed light on by interacting risk-taking perspective based on prospect theory and threat rigidity theory to suggest that slack allocation may be anchored by aspiration-driven process with diverse performance outcomes. The overall results tend to confirm the hypotheses that risk-taking capabilities play significant roles on slack-performance relationship.

On the other hand, the results found that strategic risk and operating risk has significant on firm performance. The findings is another contribution to organizational slack literature. One viewpoint has proposed that strategic risk and operating risk are distinct constructs for manufacturer firms. The findings reveal that strategic risk and operating risk are difference in nature (see factor analysis). An alternative viewpoint has suggested that if these two construct are different, they should affect performance differently.

The findings also show that while the coefficient of strategic risk is significant and positive, operating slack is associated negatively with performance. This finding suggests a positive interaction between strategic risk and post-crisis performance for higher performers. The finding also indicate that the strategic risk and performance relationship is actually more beneficial to improve firm performance.

These discrepancies was resolved by jointly considering operating slack and strategic slack in combined contexts, indicating that operating risk will have larger influence on performance in which risk-taking strategies must be for short-term rather than long-term. Empirical findings offer general support to both prospect theory and threat rigidity theory, showing the complex sets of relationship between several perspectives in understanding risk-taking. The interaction between variables indicated that how these theories complement each other.

The prospect theory proposes that the effect of risk-taking on performance should differ across performance level. These results also support the position that by increasing long-term investments or decreasing revenue by investing to long term tools, risk somewhat increases firm performance for both high performer firms. On the other hand, pre-crisis performance is in all the model estimations are statistically insignificant, although it has positive affect on performance.

A possible explanation for this might be that sudden financial shocks from short-term fluctuations in the environment. This is more likely to lead to strategy amendment after financial crisis. However, operating slack is positively associated with post-crisis performance for higher performer firms and negatively associated with low performer firms. Additionally, operating slack has not any significant relationship with performance in general model. Therefore, the findings suggest a positive connection between operating risk and post-crisis performance for higher performers. A possible explanation for these results may be the long-term investment strategies.

Firms will use excess slack resources during the crisis to absorb sudden financial shocks. Such situation will increase strategic risk because firms need to invest more in long-term strategies for future survival. If firms achieve alignment successfully after financial crisis, this indicates presence of resource flexibility against firm risks. The observed increase in operating slack could be attributed to focusing more on daily routines and activities. In this scenario, main purpose of firms is full concentration on alignment-oriented strategies. Too much focusing on alignment-oriented strategies are the most likely to make negative effect on post-performance of firms. However, the coefficient of 'low performer firms' is greater than 'high performer firms'.

This finding supports the idea of *prospect theory* that proposes that the low performer organizations tend to take more risky initiatives than high performer firms do. On the other hand, in terms of operating risk, the findings support *threat-rigidity theory* that the taking short-term risks decreases firm performance. In consistence with RBV and BTF, firms concentrate more on daily routine operations during the stable time-period and producing more slack resources in order to create strategic options for unexpected changes. Similarly, the interaction of strategic risk and operating risk is significant and positive. This shows that the interaction effects of short-term and long-term risk-taking can improve firm performance.



#### 6.1.7. Ambidexterity vs Performance

The first research finding is associated with resource ambidexterity is a process (Karrer and Fleck, 2015). The anticipated contribution is to examine how firms may become ambidextrous over-time depend on forms and level of their slack resources. For example, what particular mechanisms and processes will likely lead firms to follow ambidextrous strategy and how this process works are the addressing process-based empirical research on resource ambidexterity.

The balance of adaptability and alignment at a broad-level is approved, heuristically interesting and generally not disprovable (Venkatraman et al., 2007). Prior studies have focused on clarifying how alignment-adaptability compensation arises within the organizational routines. In this manner, researchers have made effort to cope with the tests of identifying and gauging the constructs of adaptability, alignment and ambidexterity and inter-temporal balances. Similarly, this study hypothesised that resource ambidexterity could be considered a type of delicate organizational characteristic that deploy firm's resources and mobilize these resources for the sake of firm's actions.

This study also positioned resource ambidexterity as a resource-capability (resource flexibility/resource commitment) represented in practises for adaptability and alignment in the long term. Utilizing at various levels of slack resources in the manufacturer industries over a ten-year period has obtained the result of the trade-off between adaptability and alignment; resource ambidexterity was calculated by using a delicate approach and coped with inter-temporal problems at the core of resource capability.

The key finding is that when firms be able to effectively manoeuvre at the edge of adaptability-alignment trade-off, they do so by driving adaptability and alignment to achieve year- to year firm performance. Simultaneous ambidexterity appeared to as more important influencing factor than sequential one.

This, as first empirical evidence, proof evidence that how time-frame plays a role in this essential trade-off. In order to rule out alternative explanations, the seven models were added to study. Because, single model to measure overall effect of ambidexterity on firm performance might have led to misleading conclusions.

For example, considering only model 3, which identified the main impacts of adaptability and alignment at the time  $t$  and combined effects at the  $t$ , it would have reached a different conclusion that ambidexterity is significantly associated with performance. Indeed, this finding was supported by several prior studies (He and Wong, 2004) and in harmony with common suggestion on the ambidexterity. To clarify particular role of time-pace balancing adaptability and alignment, two functional forms of ambidexterity (sequential and simultaneous) and related moderating variables, as well as time-frame, were inserted to model.

A set of moderating and control variables were employed before gauging the effect of ambidexterity on performance. The utilization of seven models enable to increase robustness of findings, especially for principal results of simultaneous ambidexterity as well as influences of environmental dynamism, industry concentration, and risk-taking on performance. The finding also provide evidence that ambidextrous firms are resilience that is a valuable firm capability to sustain long-run competitive advantage over-time.

Simultaneous ambidexterity is a essential organisational necessity in high-speed environment, which organizations considering existing environment and current opportunities. Dealing with multiple form of slack resources necessitates organizational modifications that may cause resource-limit or be contingent upon one other, culminating synchronization indecision over-time. However, coordination uncertainty prevents firms from achieving adaptability-alignment balance for different operational options that manoeuvre in different 'time-periods' (Tushman and O'Reilly, 1996).

Although sample data does not reflect that particular ‘manoeuvre mechanism’ (i.e. sequential or simultaneous) that allows for de-escalating problems of coordination uncertainty, the results show the evidences for performance heterogeneity for each mechanism to be shaped and supported over-time. On the other hand, the role of moderating variables must also be considered. As emphasised earlier, three interaction-moderating variables with simultaneous ambidexterity are significantly associated with firm performance.

While sequential ambidexterity variable has not a significant relationship, the rest of the interaction variables were observed to possess a statistically positive and significant interaction with firm performance. When considering industry concentration first, it was found that it acts negatively for the simultaneous ambidexterity and for the sequential ambidexterity. When industry concentration increases, these affect firms negatively to maintain an equilibrium between breaking new ground and maintaining the status quo regarding resources and actions, with the result that firms feel under pressure to achieve outstanding performance.

On the contrary, the effect of average sequential ambidexterity in combination with environmental dynamism is significant. This shows that increasing sequential ambidexterity provides increased benefits in uncertain industries. This result consistent with prior studies (Goossen and Bazazzian, 2012) that argued that the higher environmental velocity undermines the benefits of adaptability.

However, larger organizations may be less likely to explore innovations and the lack of risk-taking competences of exploiting on new inventions. Firms with slack abundance are also better off exploiting capabilities and assets since ‘organizational slack can easily result in over-exploration that lead to inefficiencies’ (Goossen and Bazazzian, 2012). When they balance the tension of adaptability and alignment covering two distinct chronologies, risk-taking enacts a facilitator part in attaining superior firm performance.

In a case of higher marketing intensive environment, firms can be trapped themselves into misallocating resources in order to protect its existing place in the market, thereby interpreting them unable to balance adaptability and alignment concurrently. On the contrary, better aligning to resources over-time to balance adaptability and alignment increases performance.

The findings of negative moderating impact of industry concentration provide empirical support to studies that argue that a significant investment culminates in design of access hurdles for new applicants that lack an established brand and reputation before operating efficiently in the business environment. Because, if a firm is within a more concentrated (less competitive) industry, firms are exposed to less pressure in exploration pursuits and vice versa the less focused (more competitive) an industry will face more pressure to seek efficiency and more risk-taking.

However, statistical findings on the moderating role of risk-taking add to established literature volume on the role of risk-taking on adaptation and performance. The positive moderating influence of risk-taking and simultaneous ambidexterity on firm performance and the significant result when examined for sequential ambidexterity support the function of adaptation capacity in integrating the new environmental demands. Firms accrue resources that assist to improve daily operations and routines activities so as to co-ordinate tactical options in order to take initiative for unpredictable investments and surmount negative consequences of risky projects.

Risk-adverse firms exploit sequential ambidexterity to achieve superior firm performance when comparing with risk-seeking firms, consistent with writings on strategic flexibility and dynamic capability that also supported by prospector theory and behaviour theory. On the other hand, risk-seeking firms tend to exploit simultaneous ambidexterity in order to deal with fast-changing environmental conditions.

Environmental velocity has been introduced as third moderator since rapid and discontinuous change in environmental demand could create distortion that might inhibit adaptability-alignment trade-off. It was also found that firms endeavour to balance their adaptability and alignment trade-off, which determines the connection between firm and the chronological features of its environment.

The environmental shocks on firm performance is reflected in several studies on dynamic businesses, which indicates that profitability and prosperity of firm in such environment is related to swift decisiveness (McCarthy et al., 2010). For example, the findings show that the interaction effects of environmental velocity with sequential ambidexterity leads to more performance increase than interaction effect of simultaneous ambidexterity or operating “in time with their environments and in synchrony across their subunits and activities”.

Particularly, this study also underline the significance of considering risk-taking capabilities in debates regarding the level and type of slack management. The research also made contribution to *slack literature* by concentrating on both *adaptational slack* and *adaptation processes*, whereas earlier studies principally focus on traditional forms of slack resources. A significant avenue for future studies is to enhance the understanding of readers as to why different risk-taking capabilities have distinct effects on performance.

#### 6.1.8. Key Findings and Hypotheses in the Context of Existing Studies

***Hypothesis 1 and 2***, H1a suggests that there are many positive links exist among a large number of slack variables and performance variable before, during and after financial crisis. This finding is consistent with the findings of Vanacker et al. (2016) and Marlin and Geiger (2017). For example, slack is positively associated with firm performance as Vanacker et al. (2016) found. They also found that, specifically, financial crisis enhances firm performance. Marlin and Geiger (2017) , on the other hand, demonstrated that different configuration of organizational slack result in different level of performance.

This finding is also consistent with H1a that suggests that different links and configurations exist between slack resources and firm performance. Their findings also suggested that some configuration of slack may lead to similar level of performance change in the organizations. In a similar way, Jifri et al. (2016) found that , although a linear relationship between slack and performance, excess resources seems to give the opportunities to invest in projects that enhance firm performance.

However, study found supports for pre-crisis slack resources implications on post-crisis performance. The results indicate that pre-crisis slack resources have a significant relationship with post-crisis performance. The essential distinction between before and after financial crisis is the net resource balance (Wassmer et al., 2016, Lee et al., 2015), which differentiates in different periods.

These findings further support the idea of Wan and Yiu (2009) that resource differences in different periods also depend on level of environment and magnitude of environmental jolt. Another key finding is that almost all slack variables in pre-crisis period have a significant relationship with post-crisis performance, which also consistent with the findings of Hong and Shin (2016), Lee et al. (2009).

**Hypothesis 3**, as mentioned in H3a, alignment and adaptability are distinct dimensions of adaptation process (Vahlne and Jonsson, 2017). In accordance with Aoki and Wilhelm (2016), firms aim at achieving adaptability and alignment for short-term efficiency and long-term profitability. This differentiation calls for exploration and exploitation activities to be divided firms into separate different adaptation processes.

This finding is also line with the findings of O'Reilly and Tushman (2013), Patel et al. (2013b), Clarysse and Bruun (2015), Birkinshaw and Gupta (2013), Yang et al. (2015). On the other hand, both adaptability and alignment provides firms to produce sufficient resource flexibility, which also suggested by Patel et al. (2013b). Thus, firms may achieve ambidexterity by combining these two distinct construct at the same time. In line with Güttel et al. (2015), alignment and adaptability can be distinguished as organizational relationship between flexibility and efficiency. This balancing capacity helps firms to combine exploitation and exploration, and thus achieving ambidexterity.

**Hypothesis 4**, several studies mentioned about adaptation typologies (e.g., Miles and Snows typology) in the management literature (Hampson and McGoldrick, 2013, Frambach et al., 2016) but none classified adaptation based on organizational slack resources in financial crisis. The findings show that firms have different adaptation profiles based on different level of slack resources. The findings support the hypotheses that there are managerially different adaptation profiles that are especially level and form of slack-sensitive.

In addition, results show that there are four different adaptation profiles. Firms tend to choose their adaptation strategies when their slack resources are low, as Mishina et al. (2004) and Modi and Mishra (2011) mentioned in their studies. Results also show that constructs of alignment and adaptability are unique in terms of their scope and therefore can be regarded as a potential source of competitive advantage (Canales, 2015).

**Hypothesis 5**, a key theme for existing studies entail the firm response to financial crisis. Organizational slack resources may buffer against fluctuation in during the financial crisis, thus absorbing unexpected shockwaves. This finding is also in consistent with the findings of Zona (2012), Wan and Yiu (2009), Bradley et al. (2011b) and Mahmood et al. (2017) that financial crisis affects firm performance negatively. For example, Mahmood et al. (2017) suggested that financial crisis significantly influenced organizational sales and ROA data for export-driven industries.

Similarly, Wan and Yiu (2009) suggested that while slack can be improve firm performance during an environmental jolt, financial crisis has a negative impact on firm performance. Palermo et al. (2017) also found that financial crisis leads to increased pressures on firms in an external resources. Chang et al. (2016) also found that financial crisis has a negative impact on the firm excess values. Financial crisis appears to have shifted the competitive dynamics within industries, specifically during and after financial crisis.

**Hypothesis 6**, the past studies have shown that the relationship between slack and firm performance is curvilinear. Thus this finding of thesis supports the findings of Tan (2003), George (2005) and Su et al. (2009). Ju and Zhao (2009) also found that a significant curvilinear link between slack resources and firm performance. Moreover, as additional supports, Lee and Wu (2015) found that unabsorbed slack is positively associated with R&D capital and firm performance.

They also found that relationship between performance and unabsorbed slack is curvilinear. Nason and Wiklund (2015) suggested that cash holding (unabsorbed slack) and stock market performance has a U-shaped relationship during recession. In addition to this, findings support the study of Tan and Wang (2010), which found inversed U-shaped curves in relationship between slack and performance.



**Hypothesis 7**, the findings show that environmental munificence positively influences slack-performance relationship. This result also in accordance with the findings of Wan and Yiu (2009). As Latham and Braun (2009b) mentioned, findings show that lower level of environmental munificence affects firms to access critical resources. Results also show that higher level of environmental munificence positively affect adaptation slacks.

This finding is also consistent with findings of Wu (2008) that suggested that higher level of munificence permits greater experimentations through appropriate firm resources. In accordance with Karim et al. (2016), the findings also show that environmental munificence provides a stronger and clearer of firm resource and industry growth and more munificence environment allow firms for possessing higher level of slack resources and thus regaining and maintaining an effective “fit” with their environment.

As Wan and Yiu (2009) mentioned, financial crisis may change the level of environmental munificence. Therefore, during the low munificent environmental periods, slack may play a critical role to maintain competitive advantage and allow firms to use aggressive strategies during the dynamic environment (Simsek et al., 2007). In consistent with the Ridge et al. (2017), environmental munificence captures resource abundance in terms of opportunities for market expansion.

**Hypothesis 8**, in accordance with the Girod and Whittington (2017), the findings clearly indicate that dynamic environment has a negative impact on firms with operating slack. It is also observed from the findings that while firms that use mostly strategic slack resources in environmental hostility seems that improve firm performance positively, firms that use mostly operating slack resources in such environment face reduction in firm performance.

The finding also confirms the finding of Stieglitz et al. (2015) that suggested that environmental dynamism shapes adaptive responses. According to them, dynamic environments undermines the organizational flexibility, exploration and adaptation and leads to more organizational inertia. This result is in line with recent studies (Karna et al., 2016, Burgers and Covin, 2016, Bradley et al., 2011b) that postulates an important role for dynamism in slack-performance relationship.

Adaptation processes increase the effectiveness of operating activities under highly and minimally dynamic environments. This finding also supports the findings of Wilhelm et al. (2015). Patel and Cooper (2014b) also pointed out that dynamic environments requires “open-endedness and novelty” and agile decision speed when developing adaptation strategies. Therefore, firms can increase range of strategic options through dynamic environment.

***Hypothesis 9***, firms with higher financial distress will perform at a higher level, than firms with lower financial distress. In compliance with Inamdar (2012), findings show that there are strategic difference between high performing and low performing firms, especially in related to level of slack resources. The research findings also suggest that higher performer firms are more successful companies and they have larger level of slack resources comparing to lower performer firms.

The results show that higher performer firms focuses on R&D related slack. This finding is in agreement with O'Brien and David (2014) that suggested that higher performer firms tend to seek higher level of strategic slack such as R&D slack and marketing slack. The results also indicate that there is a positive relationship between firm market value slack and firm performance. As Nguyen et al. (2016) pointed out, higher market value slack is chased by investors and that higher demand of investors enhances firm performance.

**Hypothesis 10,** In accordance with Kuusela et al. (2016), findings suggest that firms have different risk postures and risk-taking may be two separate performance outcome (Kacperczyk et al., 2015). Very early studies like Wiseman and Catanach (1997) and Aron et al. (2005) indicated that strategic risk and operational risk exhibit risk choices depend on organizational slack and environmental factors. This study supports this findings and shows that slack appears to cause mainly two types of risk, namely *strategic risk* and *operating risk*.

According to Bromiley (1991), lack of sufficient slack resources and poor performance cause risk taking. In consistent with Miller and Tsang (2011), this study also found that organizational slack increases risk-taking and demonstrated a positive relationship between strategic risk and firm performance. On the other hand, the findings show that the interaction effect of strategic slack and firm risk is associated positively with firm performance. While findings indicate that while strategic risk is positively associated with overall firm performance, operating risk has a negative impact on firm performance. This findings also in consistent with finding of Lungeanu et al. (2015), (Tyler and Caner, 2015), Vanacker et al. (2016) and Marlin and Geiger (2015b).

**Hypothesis 11 and 12,** Kang (2016) suggested that strategic resource investments are crucial for shareholders because alignment or adaptability decisions critically affect the short-term and long-term firm competitive advantage. The findings complement previous studies on the adaptation mechanism by identifying the levels and forms of slack resources, as a significant factors during the process of adaptation (Deb et al., 2016, Stieglitz et al., 2015). For example, the finding confirms the findings of Flammer and Bansal (2017), which theorized and empirically examined how strategic slack related orientations affects organizational values.

They found that long-term investment strategies lead to an increase in operating performance and firm value. The findings show that adjustment of adaptation strategies depend on the firms' bundles of slack resources and capabilities of slack management (Hong and Shin, 2016).

Specifically, availability of strategic slack and lower level of operational slack both have a significant effect on firm performance. Furthermore, Martin et al. (2015) suggested that slack resources enhance temporal orientation and long-term orientation for strategic projects.

However, Chakrabarti (2015) found that focusing on operating slack and alignment interactions important. However, organizations with low level of operating slack are as active as organizations with high level of operating slack, in implementing performance growth. In consistent with finding, the results of this thesis show that lower level of operating risk moderates positively the relationship between adaptation processes (alignment and adaptability) and firm performance.

**Hypothesis 13**, the findings of this study echo the views of Nohria and Gulati, who suggested that, *“the literature provides no clear answers because theorists stand divided on whether slack facilitates or inhibits innovation”* (1996: 1245). However, results suggest that optimal level of strategy slack and operating slack resources lead to increase in risk-taking activities. The findings also show that importance of slack is a significant consideration when a financial crisis takes places.

Wan and Yiu (2009) found that interaction between environmental jolt and risk-taking is positively associated with firm performance. This finding is also consistent with findings of Bradley et al. (2011b). In consistent with Martinez and Artz (2006), Vanacker et al. (2016) and Paeleman and Vanacker (2015), analysis demonstrate that strategic risk and availability of strategic slack are among main drivers of risk-taking behaviours.

**Hypothesis 14 and 15**, the contextual ambidexterity (simultaneous vs sequential ambidexterity) was seldom empirically studies as is the mechanism of organizational adaptation (O'Reilly and Tushman, 2013). Thesis found support for the facilitating roles of organizational slack. The findings show that simultaneous switching between alignment and adaptability provide positive impacts on firm performance and thus achieving better firm performance (Zhang et al., 2016a, Swift, 2015).

In parallel with the findings of Walter et al. (2016), the result indicated that simultaneous ambidexterity has a significant effect on firm performance. Contrary to expectations, this thesis did not find a significant relationship between sequential ambidexterity and firm performance. These findings are also inconsistent with findings of Venkatraman et al. (2007). The findings clearly show that smoothly switching between these two processes in a simultaneous way guarantees organizational adaptation (Liu and Hsu, 2016, Wassmer et al., 2016).

## 6.2. Key Contributions and Theoretical Implications

What types of firm capabilities do firms need to build to manage financial crises? This is an essential question that managers are asking as firms around business environment try to deal with the increasing pains of financial prosperity. The thesis assists provide a partial answer to this question.

Managers should improve building the skills of slack management while recognizing their usefulness in managing dissimilar conditions of the environment. Slack management aids in improving firm performance before and during financial crisis, and indirectly increases firm performance after financial crisis through adaptation strategies.

Adaptability-oriented strategies should also be stressed in environments characterized by environmental uncertainty whereas alignment-oriented strategies should be sought before and after in financial crisis. However, financial crisis is the main criteria for designing the firm resources, which provides varying adaptation ways to environment.

The findings identify that the financial crisis play a critical role to resource absorption and performance adjustment at before, during and after periods of impact. Managers should improve building the skills of slack management while recognizing their usefulness in managing dissimilar conditions of the environment. Slack management aids in improving firm performance before and during financial crisis, and increases firm performance after financial crisis through adaptation strategies.

A primarily theoretical implication is that the slack management can and should be viewed as subject to reduce impacts of financial crisis. The importance of this result is underscored by the research that the slack resources are associated with the development of adaptation processes have been almost empirically ignored in management literature.

The results support hitherto untested notions that 'slack management' from the perspective of financial crisis of 2008-09 is indeed associated with performance and shed light on this critical research gap by providing rationale evidence that the relationship is curvilinear, with varying firm performance. Intriguingly, findings show that the optimum levels of slack resources for facilitating firm performance are more important than above or below the mean of slack within sample.

To avoid performance fall, managers need to adapt rapidly to unanticipated significant environmental change, creating resource options by using slack provide flexibility. The relative frequency of reconfigurations of slack resources in order to achieve optimum level of slack helps adaptation in highly velocity environment. Therefore, managers need to reorganize their slack resources in order to adapt to dramatic changes as it requires. It is considered two forms of organizational slack in a context of such dramatic negative change. Strategic slack and operating slack were considered two important slack forms by managers in this regard, developing two measures that directly assess the organizational adaptation derived from management literature.

Based on these measures, the findings evidence that both forms of slack provided valuable adaptability and alignment for manufacturing firms in Europe during the financial crisis conditions. Thesis contributes to the management literature by indicating that managers with higher level of slack resources in place have a better ability to flexibly adapt their overall strategic manoeuvres in line with internal risks and unexpected negative changes in environment, in contrast to organizations without such slack level. Another contribution of this thesis lie in suggesting a more comprehensive framework and in proposing how slack management perspectives as alternative can be used to more utterly research the slack-firm performance relationship.

Accordingly, implications and characteristics of slack were investigated in the context of financial crisis. This thesis is to revisit the construct of organizational slack and develop a slack measure that incorporated both process of alignment and adaptability. Second, the process of alignment and adaptability may explain the positive association between ambidexterity and firm performance. Third, the findings highlight the significance and impact of slack management during the financial crisis.



### 6.3. Managerial Implications

With a total of 641 European manufacturer industries, this research also represents one of the first investigation on slack – performance relationship in context of financial crisis. Strikingly, the negative impact of financial crisis seems to trigger the choices of firms on their forms and levels of slack resources.

Furthermore, research revealed that strategic slack resources can be used much by the manufacturer firms as a buttress to support or reinforce the performance during the financial crisis. On the contrary, firms employed more operating slack resources after financial crisis comparing with strategic slack in order to increase strategic options and future prosperity by aligning current environment. These results contribute to the rising importance of organizational slack resources in the management literature.

The key findings show that manufacturing firms can enhance the firm performance by using adaptational slack like strategic slack and operating slack resources. Adaptation processes can be implemented to ensure future survival and prosperity. Adopting adaptation strategies during an unexpected event, firms can prevent possible losses through alignment and adaptability processes.

By explicitly investigating the slack-performance relationship, managers of companies in manufacturing industries can choose effectively strategic options through having various forms of slack resources when they intent to boost firm performance. Similar to reduce possible losses originated from unexpected crisis in the firm, optimal usage of slack resources can help management to bring prosperity.

The positive relationship between adaptation processes and firm performance suggests that managers should concentrate on slack management. The findings indicate that managers can manage their organizations fit with environment, and that more means more generated slack resources and correspondingly superior firm performance.

However, to maintain the continuous process of adaptation to potential environmental threats and opportunities is not easy option for managers. Managers must eliminate risk factors and avoid to be rigid organization that slow the adaptation process and promotes inefficiency in the organization. Therefore, although managers should more focus on accumulating more convertible slack resources, optimum use of slack resources is more important factor to deal with these difficulties.

Another managerial implication is that managers should pay particular attention to the slack management. This thesis suggests that manufacturing firms perceive slack management to be an organizational adaptation task with a high need for action. In addition, managers are increasingly feel themselves under pressure by enormous shifts in the environment, such as financial crisis. At the same time, managers are more vulnerable during the financial crisis compared to a stable environment due to scarce resources, lack of appropriate strategy for adaptation and limited impact on the firm performance.

Considering these tremendous challenges experienced by managers, the results suggest that successfully adaptation through slack management has a positive impact on overall firm performance. This indicates that superior slack management is a significant lever for organizational success. Managers investing in their capability of ambidexterity benefit from superior organizational performance, which is crucial to firm survival, organizational resilient and sustain long-term success. Nevertheless, the results show that optimal level of slack must be portrayed as merely satisfactory.

This indicates that manufacturing firms have considerable potential for optimization with regard to their level of slack resources. This thesis strongly suggests that slack management is a highly significant management capability before, during and after financial crisis. Managers should stress the significance of slack management and attempt to improving their firms' adaptation to new environment.

#### 6.4. Implications for Policy

Social effects of the financial crisis for manufacturing firms can only be survived successfully by using efficient slack management. Unless the social environment of the financial crisis for manufacturing firms are regarded as the key strategic problem and effective adaptation profiles are appropriately adopted, there is a very actual danger that an economically and socially beneficial industries will be increasingly less able to meet their commitments to contribute effectively to the future prosperity.

One of policy implication of the study is that the relation between performance and slack is not as straightforward as discussed in the management literature. It cannot be questioned that adaptation is vital for survival or prosperity in the long-term, but it may be influenced by different forms or level of excess resources reconfigured via financial crisis.

Another policy implication of study is that creation of more flexible resources so as to make adaptation more efficient and easier, and, consequently, to encourage more firms not taking risk before and during financial crisis. If managers are concerned with increasing performance, it should be concerned with using slack resource in an optimal level. Furthermore, if managers is concerned with adaptation, maximizing adaptation slack is not bad idea.

One of the key motivation to achieve superior firm performance is to simultaneously align and adapt to changing environment. Based on slack management, slack resources can facilitate organizational adaptation and related actions. Since ambidextrous firms possess proper strategy and sufficient resources in slack management and slack resources development, providing organizational flexibility to commit to proactive strategies.

Similarly, providing sufficient adaptation slack for developing best strategies and practices in slack management can be another important policy implication. Developing adaptation strategies in the long term seems to be a more significant problem than risk-taking activities or a positive environment. Another policy implication from the findings is that managers need a balance between adaptation processes. Overemphasis on only alignment or adaptability processes cannot ensure the long run firm performance.

## 6.5. Conclusion and Limitations

In conclusion, slack has played a significant role in economics and management theories of failure, growth, survival, ambidexterity and performance. Slack-based operations advances progressively in its appreciation of the processes of adaptation, risk-taking capabilities and environmental factors that impact slack management, organizational adaptation and organizational ambidexterity.

Theoretical arguments also continue to fluctuate in relation to the ideal level of slack an organization should retain to increase performance. In this study, it has been endeavoured to resolve these allegations and tensions by examining in which degree of slack is the most likely to enhance firm performance.

The research was also attentive to the level and forms of slack via adaptation process and has confirmed that their connection with performance is moderated by the synthesis of risk-taking capabilities, environmental munificence and dynamism. Specifically, this study focused on the association between adaption of different degrees of adaptability and alignment with varying performance implications.

The findings demonstrate the feasibility of measuring the firm's adaptation behaviours and firm's temporal adaptation (flexibility) reflected by organizational slack vary overtime. The optimal balancing of adaptability and alignment provides a key success factor and sustained performance for ambidextrous firms. This interactive effect of adaptability and alignment is also the important factor to maintain the long-term firm performance (He and Wong, 2004) for ambidextrous.

In general, ambidextrous firms have more operating slack and strategic slack than industry average. Their strategic and operating slack positively influences performance in longer period. However, ambisinistrous does not have sufficient operating slack, therefore, they are not able to use strategic slack in all sub-periods due to the resource constraints. They have lower operating and strategic slack than industry average.

The lack of a coherent adaptation strategy and sufficient resource available (operating slack) lead ambisinistrous firms to poor adaptability and alignment which leads to poor performance in the near term and future. On the other hand, adaptability oriented have higher strategic slack and lower operating slack in pre-crisis period comparing with other adaptation profiles.

Adaptability oriented firms heavily strategic in more slack in pre-crisis period and, therefore, face a shortage of available 'slack' resources. In addition, using strategic slack can be difficult and time consuming because of its absorbed nature in firms' operations. Therefore, resource constraint results in performance reduction in crisis period.

However, significant reduction in dividend pay-out, market-book value and SGA expenses during crisis allow adaptability oriented firms for reducing the cost so to improve the post crisis performance. Alignment oriented firms, however, have enough operating slack in pre-crisis period but due to the fact that aligning to the current environment too much, they face financial shock exogenously induce temporary discontinuous in the market.

Therefore, their pre-crisis resource availability higher than their resource demand make them more passive during crisis, therefore, their performance decreases during the crisis comparing to pre-crisis period. They can recover themselves during the crisis and increase their performance when they align to environment again in after crisis period. However, The balance of adaptability and alignment at a broad-level is approved, heuristically interesting and generally not disprovable (Venkatraman et al., 2007).

The key finding is that when firms be able to effectively manoeuvre at the edge of adaptability-alignment trade-off, they do so by driving adaptability and alignment to achieve year- to year firm performance. The findings also evidenced that simultaneous ambidexterity appeared to as more significant influencing factor than sequential ambidexterity for manufacturer firms. However, as can be seen in figure below, there is still an ambiguity in ambidexterity literature in terms of time dimension. The time frequency is another interesting topic that should be investigated in the future. Because, change in time frequency can have some significant implications on sequential and simultaneous ambidexterity of firms (see figure 6.1).

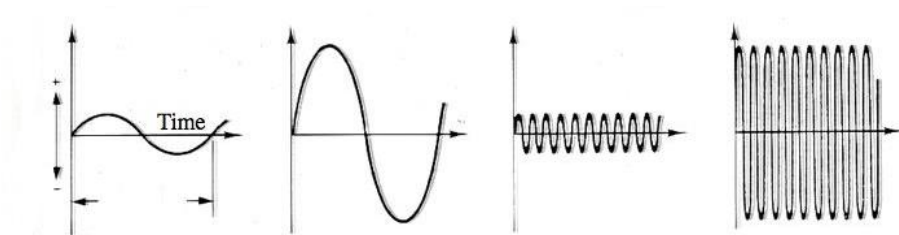


Figure 6-1 – Time Frequency

Several limitations should be detected and are expected to be addressed by future researches. First, the study shows that available data was very limited for public companies in the Thomson One Banker database. Therefore, the different form of slack resource were not able to test due to insufficient number of observations. Second, the nature of adaptation slack may contingent on the type of industry (either private or public industries) and country. Therefore, each industry and country can specifically use adaptation slack in a different manner. Future researches should explore other measures of adaptation slack for different environmental conditions.



## Summary

Financial crises are a permanent periods of economy, raising frequently since last century with significant influences on firms. This thesis was based on the antecedent that financial crisis does not affect all firms severely, and that effect of uncertainty on performance can be described by the ability of slack management to tackle the challenges of an economic crisis. Indeed, resource capability that make firms more or less vulnerable to financial crisis that can be affected by resources do exist. The conceptual framework and the empirically confirmed results make some contributions toward slack-related strategic management literature. Findings provide insights into how firms use their slack management when facing environmental uncertainty and offer insights on how firms can prepare themselves for such an uncertainty. In this Chapter, the findings were discussed in details from the perspectives and theories of study in general.

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## APPENDIX

### APPENDIX (I)

#### 1) INDUSTRY CLASSIFICATION – 2-DIGIT SIC CODES ((Nace Rev 2.)

Detail	
- C MANUFACTURING	
+ 10	Manufacture of food products
+ 11	Manufacture of beverages
+ 12	Manufacture of tobacco products
+ 13	Manufacture of textiles
+ 14	Manufacture of wearing apparel
+ 15	Manufacture of leather and related products
+ 16	Manufacture of wood and of products of wood and cork, except furniture; manufacture
+ 17	Manufacture of paper and paper products
+ 18	Printing and reproduction of recorded media
+ 19	Manufacture of coke and refined petroleum products
+ 20	Manufacture of chemicals and chemical products
+ 21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
+ 22	Manufacture of rubber and plastic products
+ 23	Manufacture of other non-metallic mineral products
+ 24	Manufacture of basic metals
+ 25	Manufacture of fabricated metal products, except machinery and equipment
+ 26	Manufacture of computer, electronic and optical products
+ 27	Manufacture of electrical equipment
+ 28	Manufacture of machinery and equipment n.e.c.
+ 29	Manufacture of motor vehicles, trailers and semi-trailers
+ 30	Manufacture of other transport equipment
+ 31	Manufacture of furniture
+ 32	Other manufacturing
+ 33	Repair and installation of machinery and equipment

included 2 digit SIC-code industries are basically manufacturer of Beverages; Chemical; Food Products; Basic Metals; Computer and Electronic; Metal Products; non-metallic mineral products; Rubber and Plastic Products; Electrical Equipment; Machinery and Equipment; Other manufacturing. (Other manufacturing including: Manufacture of medical and dental instruments and supplies, Manufacture of games and toys, Manufacture of sports goods, Manufacture of musical instruments, Manufacture of jewellery, bijouterie and related articles.

## 2) Number of Companies and Their Percentages in the dataset.

COUNTRIES	N	%
AUT	50	1.2



BEL	200	4.9
DEU	780	19.2
DNK	40	1.0
ESP	40	1.0
FIN	230	5.7
FRA	300	7.4
GBR	1320	32.5
GRC	380	9.4
HUN	30	0.7
IRL	40	1.0
ITA	180	4.4
NLD	120	3.0
POL	230	5.7
PRT	10	0.2
SVK	20	0.5
SVN	50	1.2
SWE	20	0.5
	4060	100

## APPENDIX (II)

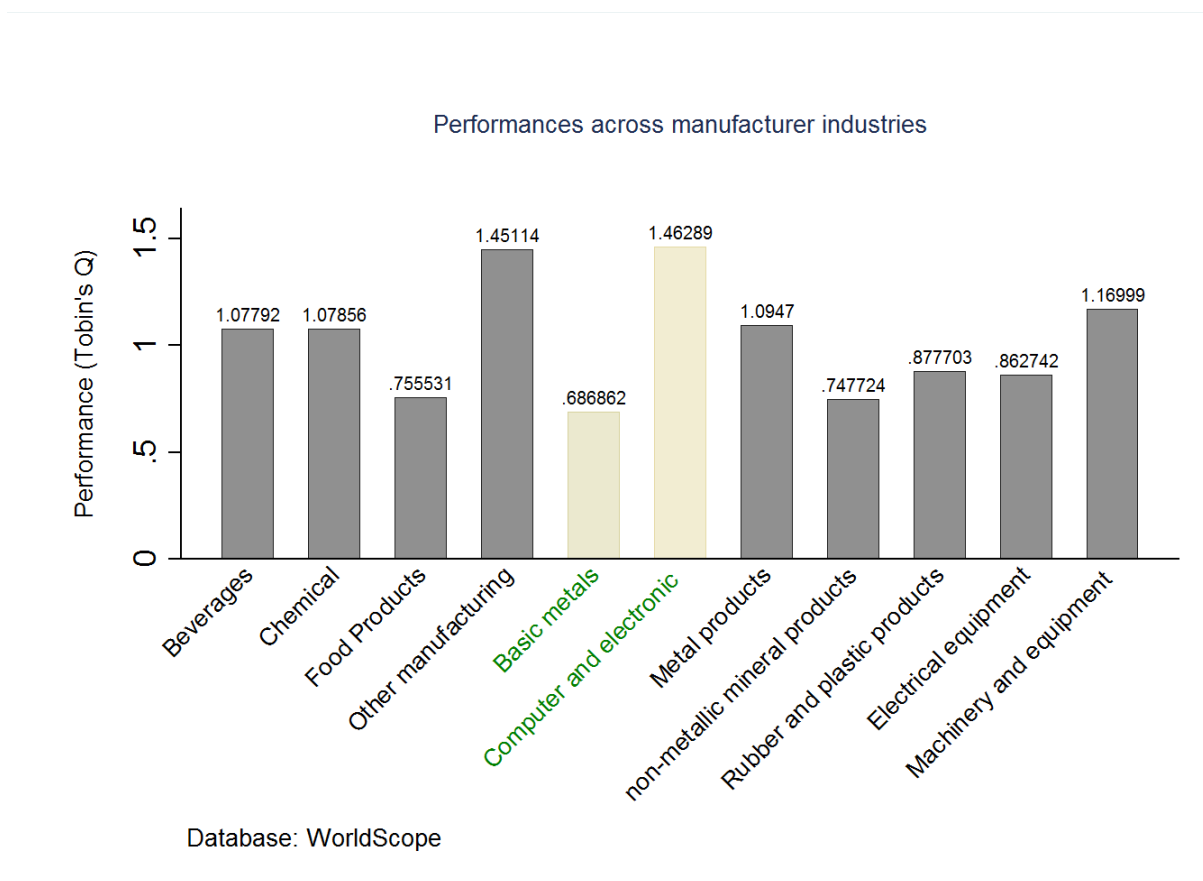
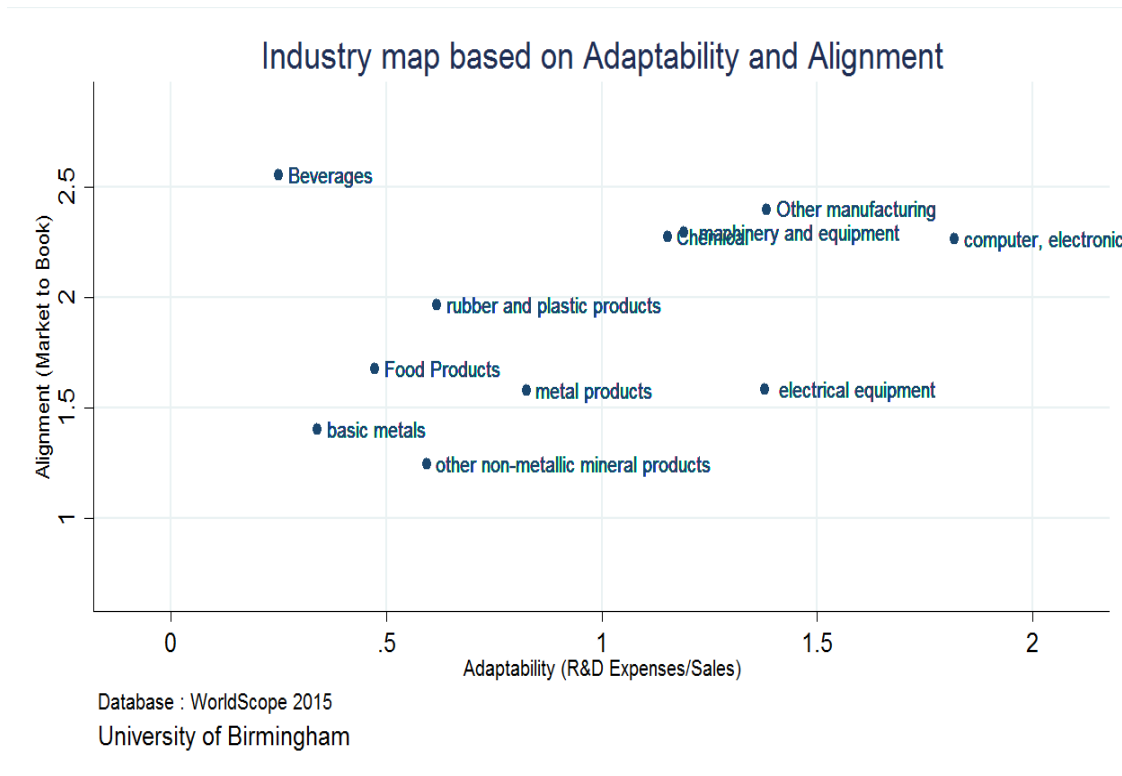
### 3) INDUSTRY ANALYSIS

Industries		R&D Intensity	Working Cap.	Dividend	Inventory	SGA Exp.	MTBV	Cash	Employee	Asset Turnover	Leverage
	Mean	0.25	0.233	1.084	0.346	3.241	1.106	0.103	12.398	0.983	3.236
	Median	0.057	0.08	1.48	0.16	3.376	1.066	0.043	12.319	0.932	3.582
	SD	0.652	0.477	0.701	0.373	0.529	0.553	0.153	0.772	0.483	1.543
	Mean	1.153	0.199	0.962	0.259	3.025	1.078	0.175	12.144	0.984	3.322
	Median	1.088	0.168	1.414	0.208	3.1	1.017	0.063	12.173	0.972	3.806
	SD	0.79	0.23	0.705	0.203	0.722	0.479	0.533	0.747	0.447	1.591
	Mean	0.474	0.11	1.011	0.166	2.731	0.915	0.095	11.965	1.01	3.348
	Median	0.305	0.066	1.456	0.141	2.686	0.876	0.032	11.925	0.961	3.787
	SD	0.562	0.331	0.715	0.122	0.675	0.431	0.266	0.996	0.507	1.57
	Mean	1.383	0.343	0.756	0.366	3.483	1.093	0.181	11.641	0.998	3.354
	Median	1.501	0.281	0.000	0.32	3.516	1.04	0.113	11.66	0.938	3.698
	SD	0.952	0.337	0.769	0.24	0.67	0.493	0.318	0.53	0.521	1.511
	Mean	0.34	0.164	0.821	0.246	2.281	0.788	0.053	11.972	0.967	3.279
	Median	0.23	0.142	1.248	0.213	2.35	0.739	0.038	11.966	0.854	3.791
	SD	0.385	0.254	0.736	0.14	0.705	0.411	0.055	0.629	0.535	1.593
	Mean	1.819	0.321	0.631	0.258	3.077	1.105	0.221	11.822	0.973	3.269
	Median	2.063	0.273	0.000	0.238	3.114	1.021	0.141	11.779	0.931	3.752
	SD	0.988	0.391	0.746	0.159	0.67	0.468	0.315	0.85	0.474	1.65
	Mean	0.825	0.249	0.988	0.193	2.792	0.84	0.141	11.592	1.003	3.174
	Median	0.596	0.185	1.445	0.182	2.925	0.755	0.093	11.52	0.954	3.553
	SD	0.736	0.367	0.733	0.114	0.807	0.452	0.186	0.715	0.453	1.587
	Mean	0.594	0.233	0.924	0.35	2.981	0.8	0.165	12.064	0.999	3.276
	Median	0.461	0.201	1.404	0.281	3.121	0.737	0.072	12.005	0.917	3.663
	SD	0.591	0.249	0.743	0.233	0.712	0.381	0.427	0.891	0.47	1.613
	Mean	0.618	0.108	1.121	0.19	2.738	0.961	0.097	11.571	1.016	3.106
	Median	0.487	0.115	1.435	0.182	2.731	0.879	0.047	11.516	0.985	3.433
	SD	0.577	0.27	0.628	0.081	0.464	0.478	0.284	0.745	0.487	1.478
	Mean	1.378	0.275	0.807	0.212	2.933	0.89	0.177	11.406	1.056	3.269
	Median	1.281	0.169	1.229	0.203	2.971	0.85	0.065	11.591	1.003	3.709
	SD	1.134	0.409	0.739	0.092	0.759	0.445	0.401	1.173	0.508	1.554
	Mean	1.191	0.264	0.912	0.287	2.833	1.068	0.145	11.768	0.968	3.312
	Median	1.08	0.217	1.375	0.267	2.932	0.99	0.084	11.723	0.93	3.767
	SD	0.824	0.246	0.733	0.141	0.648	0.501	0.267	0.674	0.468	1.598

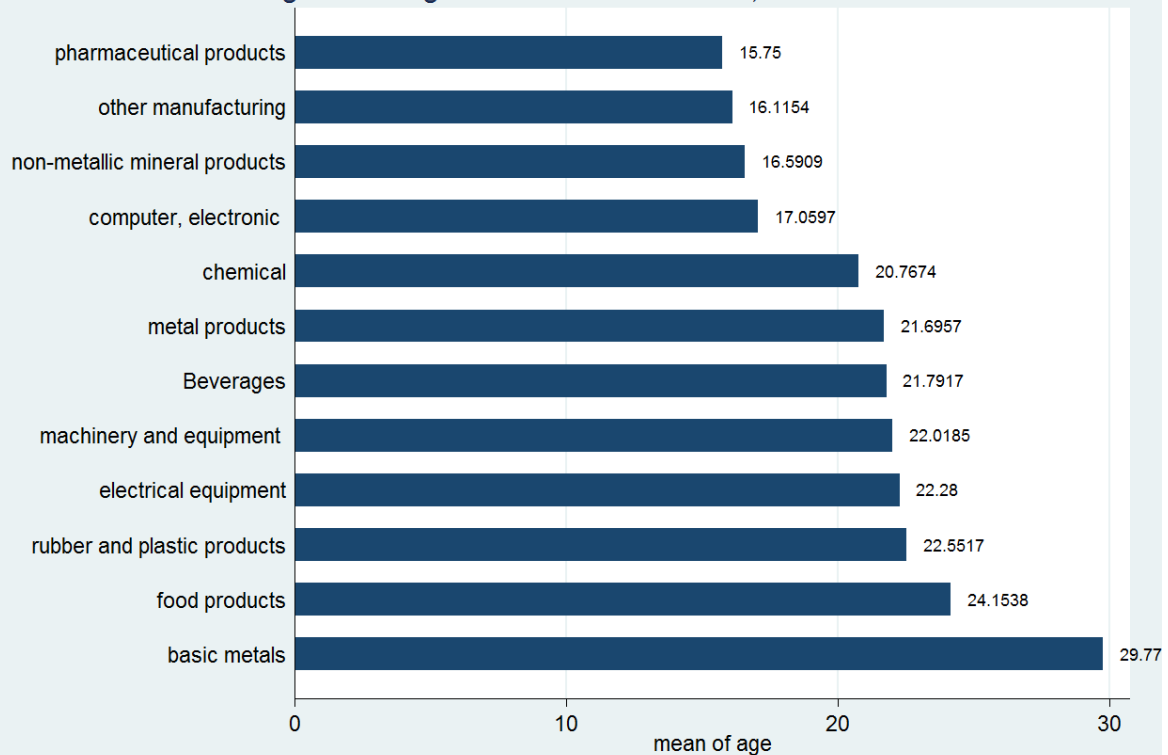
<i>Computer and Electronics vs.</i>	Food Products	Beverages	Chemical	Rubber and Plastic Products	Other Non- metallic Mineral Products	Metal Products	Electrical Equipment	Machinery and Equipment	Other Manufacturing
R&D	1.345***	1.569***	0.666***	1.201***	1.225***	0.994***	0.441***	0.628***	0.436***
	-21.02	-15.55	-10.78	-14.77	-15.74	-11.6	-5.15	-11.53	-5.66

Working Cap.	0.211*** -9.76	0.088** -3.11	0.122*** -6.11	0.213*** -8.72	0.088*** -3.69	0.072* -2.53	0.047 -1.74	0.058** -3.27	-0.022 (-0.83)
Dividend	-0.380*** (-8.09)	-0.453*** (-8.35)	-0.331*** (-7.17)	-0.490*** (-9.32)	-0.293*** (-5.21)	-0.357*** (-5.84)	-0.176** (-3.25)	-0.281*** (-6.62)	-0.125* (-2.28)
Inventory	0.093*** -10.78	-0.088*** (-5.24)	-0.001 (-0.09)	0.068*** -7.13	-0.091*** (-7.32)	0.065*** -5.92	0.047*** -4.84	-0.029*** (-3.54)	-0.107*** (-8.28)
SGA Exp.	0.346*** -7.83	-0.164** (-3.07)	0.052 -1.11	0.339*** -7.13	0.096 -1.82	0.285*** -4.68	0.144** -2.61	0.245*** -6.08	-0.406*** (-7.96)
MTBV	0.190*** -7.05	-0.001 (-0.03)	0.027 -0.96	0.144*** -4.49	0.305*** -10.15	0.265*** -7.67	0.215*** -6.8	0.038 -1.43	0.013 -0.38
Cash	0.127*** -7.22	0.118*** -6.35	0.047 -1.88	0.124*** -5.96	0.056* -2.36	0.080*** -3.79	0.044 -1.9	0.077*** -4.87	0.04 -1.84
Employee	-0.143** (-2.61)	-0.576*** (-10.30)	-0.322*** (-6.69)	0.252*** -4.44	-0.241*** (-4.13)	0.230*** -3.7	0.416*** -6.33	0.054 -1.31	0.181*** -3.36
Asset Turn.	-0.037 (-1.30)	-0.01 (-0.32)	-0.01 (-0.38)	-0.043 (-1.33)	-0.025 (-0.81)	-0.029 (-0.85)	-0.083* (-2.54)	0.005 -0.21	-0.025 (-0.72)
Leverage	-0.079 (-0.82)	0.033 -0.3	-0.053 (-0.54)	0.164 -1.49	-0.007 (-0.06)	0.096 -0.79	0 0	-0.042 (-0.48)	-0.085 (-0.75)
N	1210	1040	1200	1040	1050	970	1040	1400	1020
<b>Basic Metals</b>									
<b>vs.</b>									
R&D	-0.134* (-2.59)	0.09 -1.38	-0.812*** (-11.95)	-0.277*** (-5.01)	-0.253*** (-4.66)	-0.484*** (-7.15)	-1.038*** (-11.70)	-0.851*** (-17.77)	-1.042*** (-14.55)
Working Cap.	0.054* -2.34	-0.070* (-2.18)	-0.036* (-1.97)	0.056* -2.57	-0.069*** (-3.33)	-0.086** (-3.08)	-0.111*** (-4.02)	-0.100*** (-5.58)	-0.179*** (-7.22)
Dividend	-0.190** (-3.08)	-0.263*** (-3.94)	-0.141* (-2.33)	-0.300*** (-4.68)	-0.103 (-1.48)	-0.167* (-2.27)	0.014 -0.21	-0.091 (-1.53)	0.065 -0.93
Inventory	0.080*** -8.23	-0.100*** (-4.24)	-0.014 (-0.99)	0.055*** -5.78	-0.104*** (-6.76)	0.053*** -4.74	0.034*** -3.46	-0.041*** (-4.15)	-0.120*** (-7.39)
SGA Exp.	-0.450*** (-7.83)	-0.961*** (-15.46)	-0.745*** (-12.23)	-0.458*** (-8.20)	-0.700*** (-10.61)	-0.511*** (-6.62)	-0.652*** (-9.37)	-0.552*** (-10.01)	-1.202*** (-18.95)
MTBV	-0.126*** (-3.94)	-0.318*** (-7.77)	-0.289*** (-8.33)	-0.173*** (-4.73)	-0.012 (-0.37)	-0.052 (-1.36)	-0.101** (-2.86)	-0.279*** (-8.86)	-0.304*** (-7.97)
Cash	-0.041* (-2.57)	-0.050*** (-5.19)	-0.121*** (-3.80)	-0.044** (-2.67)	-0.112*** (-4.65)	-0.088*** (-7.13)	-0.124*** (-5.43)	-0.092*** (-8.51)	-0.128*** (-6.84)
Employee	0.007 -0.1	-0.426*** (-7.01)	-0.172** (-3.08)	0.401*** -6.81	-0.092 (-1.42)	0.380*** -6.14	0.566*** -7.23	0.204*** -4.26	0.331*** -6.5
Asset Turn.	-0.044 (-1.12)	-0.017 (-0.40)	-0.017 (-0.46)	-0.049 (-1.17)	-0.032 (-0.77)	-0.036 (-0.83)	-0.090* (-2.08)	-0.001 (-0.03)	-0.031 (-0.70)
Leverage	-0.069 (-0.57)	0.043 -0.33	-0.043 (-0.35)	0.174 -1.35	0.003 -0.02	0.106 -0.76	0.01 -0.08	-0.032 (-0.28)	-0.075 (-0.57)
N	770	600	760	600	610	530	600	960	580

#### 4) Position of industries based on adaptation process of firms

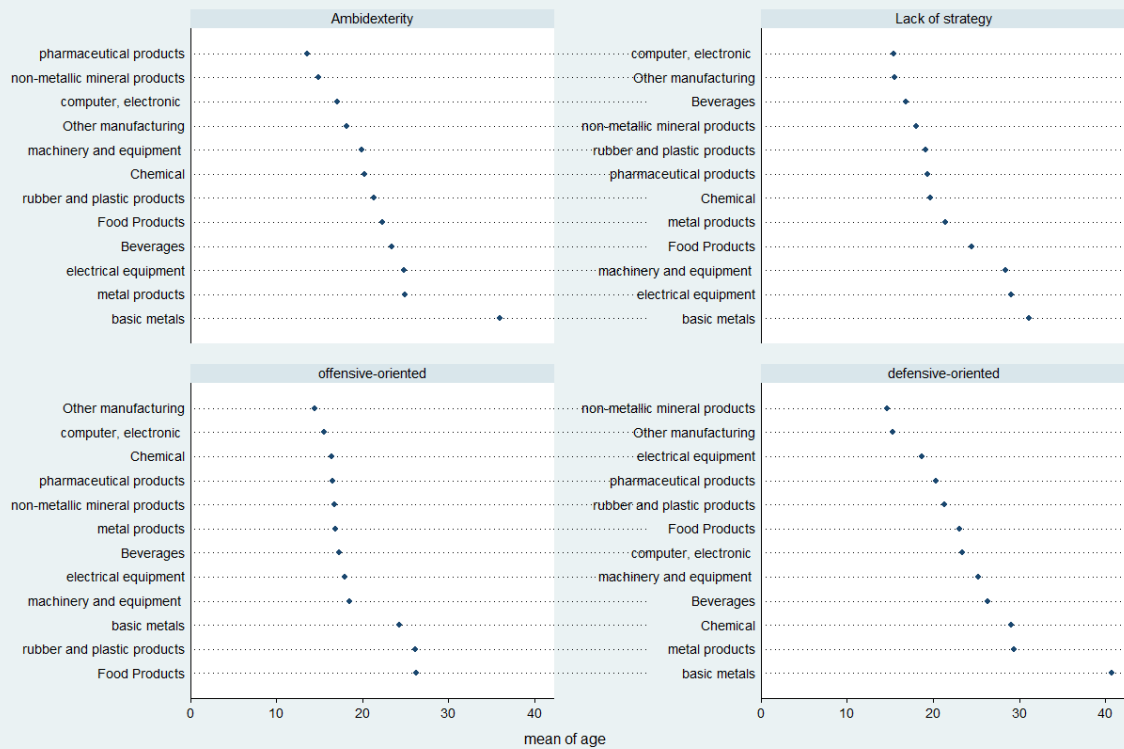


Average mean-age of manufacturer firms, 2004-2013



Source: 2014 data from Worldscope, U.K. Uni. of Birmingham, Business School

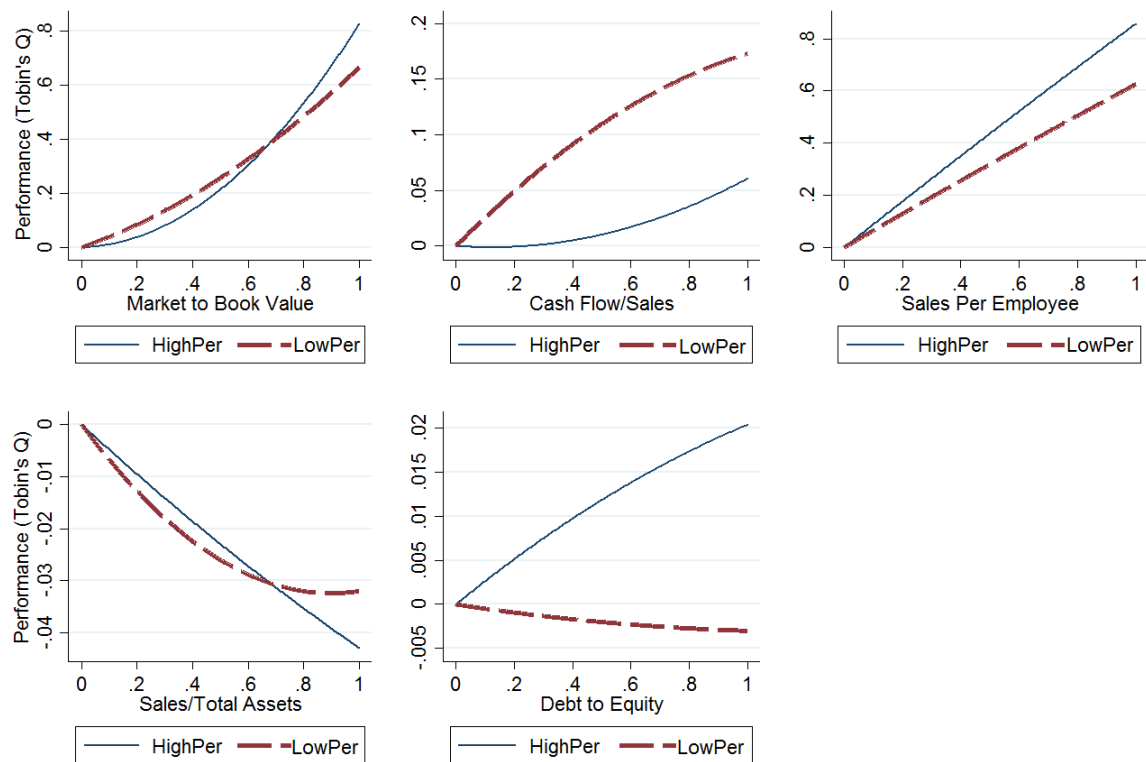
Average mean-age of manufacturer firms, 2004-2013



Source: 2014 data from Worldscope, U.K. Uni. of Birmingham, Birmingham Business School

## 6) Performance Interaction for each slack variable

The relationship between operating slacks and performance



The relationship between invested slacks and performance

